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03

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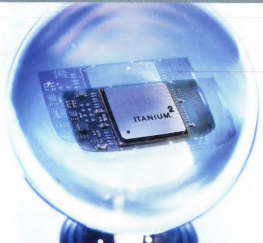


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What sort of chip will power your next desktop, notebook or server? *Matthew Overington* looks into the CPU crystal ball and reveals what's in store from AMD, Intel, Transmeta and other chip-makers as they continue to push Moore's Law to the limit.



## Small wonders 66

Small form factor "barebones" systems are the hottest thing to happen to the desktop for years. They're compact, quiet and a DIY box-builder's delight. *David Lin* checks out the latest mini PCs.

## Cheap thrills 78

You've got better ways to spend a grand than splashing out on a top-flight video card. *Justin Kranz* rounds up nine budget-friendly cards to set your system soaring for under \$400.



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MY TV

Tue, May 13 12:34

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March 2004

# OnTest

Detailed product reviews and comparisons

## Reviews

### Intel's "Prescott" Pentium 4 SSE3 processor

The latest Pentium 4 powerplant runs hot and fast.

### AMD Athlon 64 FX-51 processor

### Windows XP Service Pack 2

### Red Hat Enterprise Linux WS 3

### Hauppauge Media MVP

### Winamp 5 Pro

### Discreet Studio 3D Max

### Protac Excel G556 notebook

### Medion MD6100 notebook

### Netgear WGT624 "G+" wireless router

### Panasonic PT-AE500 projector

### Creative Nomad Jukebox Zen Xtra

### TDK Armour Plated DVD-R

and more...

## Labs Challenges

### Barebones "small form factor" systems

David Lin finds that good things can come in small packages, as he sets Shuttle's XPC against the new wave of SFF boxes.

### Mid-range graphics cards

Fast, good looking graphics don't have to cost as much as the rest of your computer's components combined. Justin Kranz looks at nine cards to suit a mid-range budget.

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## need to know

News, views and analysis from the IT world

- ◀ Anti-spam laws come into effect in Australia next month — but will they make any difference?
- Following the waves of high-profile virus infections in 2003, authorities are working hard to identify cyber-criminals and bring them to justice.
- The ACT recently passed a law advocating the consideration of open source software in government contracts, but similar success at state or federal level looks doubtful.
- ◀ Consumer groups are urging retailers to cover virus infections under warranty or face damages claims.
- Online auction scams made up a whopping 90% of all Internet fraud claims in 2002.

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## WORKSHOP

Hands-on with hardware and software, plus bonus CD content

### Windows 2003 Server

Windows 2003 Server adds a wide range of handy new Management Consoles.

### Network Shell

Serdar Yegulalp shows the secrets to managing your network settings in Windows 2000, XP and 2003.

### Windows script host, part 3

The final instalment of our foray into Windows scripting delves into some of its more powerful features.

### Linux kernel 2.6

Get up and running with the fresh-popped Linux kernel.

### Easy Software Products CUPS

Print from any computer to a Linux or \*NIX print server.

### Photoshop actions

How to use the 140 free Photoshop actions on this month's cover CD set.

### Ipswitch WS FTP Server

Share files with workmates, family and friends by setting up your own FTP server.

### Build your own game server

Get set for a private frag-fest with your online mates.

### Managing PDA cards

How to make the most of SD, MMC and CF memory cards.

and more...

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### Games

Beyond Good and Evil; Neverwinter Nights: Hordes of the Underdark; Lords of Everquest; NFL Street.

### Books

Digital Video Compression; The Art of Java; Absolute Beginner's Guide to Building Robots; Complete Wireless Home Networking; How to do Everything: HTML & XHTML

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## Penguin power

Linux kernel 2.6.1 updates the major kernel 2.6 released by Linus Torvalds last December. If you haven't begun already, it's time to get cracking with kernel compilation. Check out the Workshop article on page 122 for more information. The CD also includes some handy extras.

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- Camtasia Studio 2 — trial version
- Special offer

## Defrag for Windows 1.0

Defragment your hard drive with more speed and efficiency than the sluggish built-in

Windows defragmentation utility. As PC Mesh's Defrag for Windows runs from the command line, there are no fancy graphics to slow it down.

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## Camtasia 2.2

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## Game servers

Set up your own game server for fun with the software on this month's cover CD set. Control who comes to play and take direct action against cheats while making the most of your broadband connection. The Workshop article on page 132 shows you the way.

## Your own beat

Whether composing music or playing DJ with some MP3 tracks, this month's audio feature takes you through the software for setting up a virtual mixing and recording studio on your PC. Check out the feature on page 102 for reviews of some of the software included on the cover CD set.

## Latest graphics card drivers

Grab the latest drivers from nVidia and ATI including proprietary Linux drivers. The ATI Catalyst Software Suite includes Display Driver, HydraVision, Multimedia Centre and Remote Wonder software packages. nVidia's ForceWare Release 50 supports a host of new technologies.

**WS\_FTP Pro 7.62** — full-working version  
• WS\_FTP Pro 8.03 — trial version  
• WS\_FTP Server 3.14 — full-working version  
• WS\_FTP Server 4.02 — trial version  
• Special offer  
• Huge Brother Local Server Monitoring Tool

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**Camtasia 2.2** — full-working version  
• Camtasia Studio 2 — trial version  
• Special offer

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- WS\_FTP Pro 7.62** — full version  
• WS\_FTP Pro 8.03 — trial version • WS\_FTP Server 3.14 — full version

## Need help?

- While we've taken all care in selecting the software and testing the discs, APC cannot accept responsibility or liability.
- APC does not provide support for programs included on the discs.
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Phone: (02) 9288 9111

- WS\_FTP Server 4.02 — trial version
- Special offer
- Huge Brother Local Server Monitoring Tool

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- Computer Profiler 2.5.1
- FileMonkey 9.04
- Pengo Toolbar 1.2
- Resource Hacker 3.4
- SlickRun 3.0.0.1



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MARCH 2004



Sometimes it seems like change is the only constant in this business. Even when the pace of change drops from hectic to a constant rumble, there's still enough of it going on that whatever piece of hardware you're planning to buy becomes a moving target.

That's especially true of a full-blown PC, and there'll be a lot of those ducking and weaving in the crosshairs this year. That's because PCs bought in the lead-up to Y2K and the GST are rapidly approaching their use-by date. 2004 should be a good year for box-builders and buyers, and a lot of that has to do with the rate of change. From where we stand, 2004 looks to be a year that's less about rampant tech-revolution than a steadily manageable evolution. Windows XP has reached comfortable mid-life maturity, with the odd service pack to keep a spring in its step. And while AMD and Intel are eternally beavering away on the Next Big Things in the processor world, our CPU roadmap feature (page 88) reveals that this year's focus is on finetuning existing platforms. This makes it a good time to buy, as you can pick up mid-stream purchases and enjoy seeing last year's hot technology move into your price range.

So don't be a victim of change. This is the year to take advantage of it, either by stepping up to a new PC in the lull between the storms, or by some clever upgrading of your existing machine. The trick is to stay well informed so that you buy smart, every time.

Speaking of change, this issue marks my last as editor of APC. The past three years have been a superbly enjoyable experience. I'm proud to have played a part in the history and evolution of Australia's premier computer magazine, and to have worked with our ace team of staff and contributors. And thanks to you, our readers, for being there to share the ride!

David Flynn

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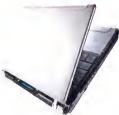
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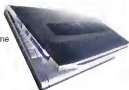
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# need to know

News, views and analysis from the IT world

## Warranty not warranted

Consumer groups urge virus victims to claim damages after a raft of Trojans steal thousands of dollars from Net bankers. *William Maher reports.*

Computer retailers are being urged to cover some virus infections under warranty, following the news that some Australian Net banking users without virus protection lost thousands of dollars over Christmas to online Trojans.

In one case, a National Australia Bank customer reportedly lost \$9,000 after using a machine infected with a Trojan which stole her account details. Commonwealth, St George, Westpac and ANZ bank customers were also reportedly affected. The infected computers did not have antivirus protection.

Now consumer groups are urging new PC owners without virus protection to claim virus infections under warranty, despite objections from retailers. If enforced, the move would represent a radical shift in the responsibility of retailers, who until now have limited warranty cover to hardware only.

The challenge comes from the Australian Consumers Association (ACA), which said

retailer was "persuaded" to fix the machine free of charge.

While there is no specific legislation under the NSW Fair Trading Act covering virus infections, the ACA points to the Commonwealth Trade Practices Act, which states that products should be "fit for purpose".

"At the very least, it's not unreasonable to expect that you'd be advised by the shop assistants to buy any necessary software not included with the computer before connecting," said the ACA.

The consumer group suggests PC owners who find that retailers won't cover virus infections in this situation should file a complaint with consumer affairs, the fair trading tribunal, or a small claims tribunal.

Retailers believe the move is "pushing the boundaries" of who's responsible for protecting against Internet viruses. While most agree to fix virus infections for free, they disagree that it should be covered under warranty.

## New viruses are appearing every week... where do you draw the line?

the extent of the virus problem means security should now be a basic provision for new PCs. If a PC with an internal modem is sold without virus protection and the user is infected, the ACA argues retailers should be obliged to fix it free of charge.

"It's reasonable to assume that a computer equipped with an internal modem will be used to connect to the Internet and therefore should be fitted with all the necessary software to function safely while users are online," explained *Computer CHOICE*.

An ACA official said one person has already used the argument successfully after sales staff sold an Internet-ready PC without mentioning the importance of antivirus software. The PC was infected while still under warranty and the

"Most of the time we would probably do it for them anyway," said David Kong of Sydney-based retailer Emagen. "But putting it underneath warranty is another issue. How much responsibility are you willing to force onto the retailer? I think these consumer protections are going to make it way too broad."

With new viruses appearing every week, Kong said customers could easily get infected despite having antivirus software. "A retailer can provide the most up-to-date protection [on purchase], but six months down the track, when [the customer] hasn't updated anything and a virus hits them — all of a sudden we're responsible for that?"

*Continued on page 14*



Point of order: whose fault is it when the hacks attack?

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APC readers have their say.



## Australia's Geek elite

**Wanted: Jason Currie, potential heir to the Geek throne. Currently missing in action, suspected of being locked in the Matrix.**

The results are in and the 2004 Geek crown is ready to be placed on the head of Jason Currie. Hooray! Except the Geek royal-in-waiting was nowhere to be found at press time.

Despite a national manhunt, the potential Geek master has evaded APC Investigators who are now stepping up their search to encompass the whole globe. If Mr Currie is not found in time for the next issue, we will initiate an immediate re-draw.

Currie scored full marks on the quiz printed in the magazine, leading judges to be split about his genius or exceptional common sense of plugging in the correct answers already printed. But since he also managed 15 out of 15 for the special online-only super test, it's clear he's worthy of the Geek crown.

The test is either getting easier or APC readers are getting smarter. APC staffers served up what were considered some of

the toughest questions in the tech universe, but this year's Geeks blitzed last year's scores overall with more quiz-meisters scoring 99 and 100 than last year. Or at least, they cheated better.

But they couldn't cheat all the way. This year, our canny quiz masters put an additional 15 questions online at [apcmag.com](http://apcmag.com) to truly test the mettle of those vying for the accolade of Geek of the Year. And the \$6,500 prize of course — the Optima-Intel P4 multimedia machine packed with Microsoft Office 2003 Professional, Norton SystemWorks Professional and Adobe Creative Suite.

Congratulations go to the 46 readers who aced this year's test with perfect scores of 100. Twenty-four readers came close with scores of 99 compared to the mere 17 high achievers in last year's test. Only two entrants scored a perfect 15 out of 15 in the online super-test, while seven came close with 14 out of 15. But it wouldn't be an APC Geek IQ test without a sneaky geeky twist. Only three



readers picked up that the final score range of 71-80, denoted by *Matrix* character Ghost, was in fact a picture of Seraph. It was our little meta test and the readers who let us know did so with style and grace.

Congratulations to those astute readers — look out for a copy of next month's issue of APC free in the mail.

## Geek Honour Roll

Larry And'y, James Benoit, Adrian Blong, David Burza, Ryan Capra, Gary Cholakyan, Samuel Cochran, Michael Coight, Shaun Collins, Shane Courtney, Jason Currie, Jeremy Davies, Christopher Dayne, Chris Dick, Bree Falk, Christian Flint, Kevin Fong, Mohammad Falemi, David Gee, Lin Hampton, Shay Hancock, Twanley Hidayat, Robert Krajnyk, Greg Lawrence, Chad Ladden, Siow Yi Lim, Wen Liu, Yifu Miao, Andrew Mickenko, Mick Mickenko, Florian Mutter, Derek O'Connell, Glen Oldenhuis, Ben Orchard, Mitchell Piper, Shawn Rego, Dean Richards, Tim Richter, Mafdy Sedrak, David Singler, Nordic Snoopy, Wen Tian, Albert Tjipitabudy, Henry Truong, Daniel Van Heerden, Shayne Wright and Max Young. **Seraph ain't Ghost winners:** S Singh, Julian Smart, Tony Gooderham.

Go to <http://apcmag.com/geekiqtestwalloffame> to see the Wall of Fame for readers scoring 15 out of 15 in the online-only quiz.

Continued from page 13

"If the hardware all works, then the computer is fit for its purpose," he said. "I think most people have accepted the fact that... software for protecting their PC is their responsibility."

Also disagreeing with the ACA's claim is managing director of Plus Corporation Nigel Fernandes, whose customers range from large corporate organisations to home enthusiasts. Plus Corporation also fixes customers' virus infections for free, but Fernandes warned warranty issues could land retailers in hot water.

"Where do you draw the line?" he asked. "Next we'll have a situation where a retailer has sold Norton AntiVirus [with the computer], but they've got an ADSL connection with a router, and you didn't sell them Norton Internet Security and someone hacked in through their router. It goes on and on."

Vendors point out that there is already a wide range of antivirus programs available online, including free virus checkers and Web sites which scan PCs for free. Some motherboard manufacturers bundle antivirus software with their products.

But many PC owners just aren't interested in taking responsibility. Part of the reason is that keeping PCs secure is becoming increasingly time consuming, especially on dialup connections. As well as antivirus software, PCs require crucial Windows updates — a brand-new Windows machine might require 34 update files to be downloaded, for example, more than half of which are security related. Some say the job could be made easier if the updating was done before PCs leave the shop.

"It's pathetic that companies like Dell can't harden the things a little before shipping them out," said one disgruntled PC user posting on Slashdot. "Your average Joe who buys a system and plugs it in is just a sitting duck."

Retailers point out problems with this idea, saying that some patches and updates can cause technical problems. "If it ain't broke, don't fix it," said one retailer.

"We have situations where fixes may fix one problem, but break something else. We set it up so the machine is working flawlessly. It's up to the customer as to whether they want to install these service packs or not," explained Emagen's Kong.

He believes rules would have to be changed to make retailers liable for PC security. "You know how cars have minimum safety standards? You'd have to start putting some sort of guideline in law for PCs before that would really start to kick off."

Warranty issues aside, security is nevertheless likely to become an increasingly important consideration for vendors. One Sydney based retailer, City Notebook Centre, is advertising on its Web site three-year free virus support (with conditions) with all new laptops sold. The offer is separate to "actual operating problems" not covered by the notebook manufacturer's warranty.

Others say security will become an increasingly important part of the minimum specification for new PCs. "It's heading that way," said IDC personal computer analyst Imraan Ali. He says it's up to shoppers to make sure they include security when buying a new PC, but retailers also have a role to play. "Retailers need to push the 'buyer beware' message. They have to take some responsibility."

For more information on the fight against malware, see "Virus Wars" on page 24. **ETC**

# All bids are off

**Hundreds of people are falling foul to sophisticated auction scams.**

At first glance, Angelo Mercado seemed like any of the other thousands of people selling small items like keyrings and scorpion pendants on eBay. Eventually though, he would disappear with the Australian Federal Police on his tail, leaving behind hundreds of angry victims duped out of more than \$50,000.

Serial scammers continue to rake in huge windfalls despite the efforts of police and assurances by eBay that the incidents are uncommon. In another recent case, more than 130 people claimed to be victims of an eBay scammer who netted more than \$10,000.

eBay has over 85 million registered users worldwide, with close to 6 million of these registered in Australia. The company says around 2 million auctions are completed each day, 99.9% of which are successful.

## Mistrust of the auction system is rife . . .

However, scammers are coming up with new tricks, such as luring victims into private sales outside the auction system. Some even set up fake escrow services to give buyers a false sense of security. The US-based National Consumers League says auction scams have jumped from about 70% of all Internet

fraud complaints in 2001, to 90% in 2002.

Mistrust of the auction system and eBay itself is rife, with many of Mercado's victims refusing to talk openly to the media for fear that eBay would use it as an excuse not to pay up. "The level of anger towards eBay in relation to how easily this fraud occurred is astounding," said one.

Mercado used eBay to build a list of satisfied customers, then lured them to a separate private shopping site. On 12 September, 2003, he registered the domain shopmercado.com and started listing more expensive items for direct sale — mobile phones, notebook and computer hard drives and digital cameras — all with 100% money back guarantees.

Meanwhile, Mercado's eBay business was booming, with almost 200 items listed between 28 November and 2 December, most of them as one day auctions. At midnight on 3 December, Mercado's final auction closed.



► **No more bids:** despite the efforts of anti-fraud squads, scammers are winning big as the hammer comes down.

\$50,000. The money was lost in auctions conducted on eBay and direct sales on Mercado's shop site.

The voicemail on Mercado's mobile phone (a pre-pay kit he bought on eBay) was full. Angry buyers looking for Mercado converged on an address in Sydney only to find a wall of private post boxes and a Chinese medicine shop.

Mercado spent four months building his eBay business, but his is by no means the most sophisticated scam. As recently as November 2003, Australian eBay users were receiving emails asking them to go to a phony eBay home page and enter their user names and passwords or their account would be cancelled.

A dangerous trend is the use of direct debit — used by most of Mercado's victims. Winning bidders are given the seller's bank account details and can pay directly into an account using an Internet banking service minutes after the auction closes. Direct debit isn't safe for buyers, since direct deposits can't be cancelled like cheques or credit card payments.

Unless the police are able to track down scammers through bank accounts or eBay member information, it's unlikely that any victims will ever see their money again.

At the time of writing, the Australian Federal Police were looking into the Mercado matter. However, many of the victims were not expecting to ever see their money again.

**William Maher and Louise Richardson**

Which is, coincidentally, when the negative feedback began to appear.

Mercado's eBay account was suspended and bidders were advised to use caution in deciding whether to complete their transaction.

It was too late. Over 100 buyers had lost money to Mercado, totalling more than

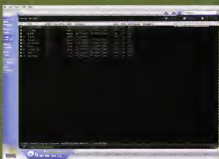
## Is it legal . . .

**to make a backup copy of a CD you have paid for?**

Illegal download sites often claim you're legally protected if caught downloading. But is this widely-circulated rumour true?

The short answer is no. Making MP3s or burning copies of CDs or movies you have paid for is not legal in Australia. "With one exception, there is no such thing as making a backup copy of anything [under copyright]," said intellectual property lawyer Michael Williams. The only time backup copies are okay is with computer software, although there are strict rules. You are usually allowed one backup copy, which is not to be shared.

"There's a perception that because DVDs involve some elements of software [for



► **Copyright?** It's illegal to copy CDs you've bought, but it's not a crime unless you sell or distribute the copies.

playback on PCs), then it's the same as copying software," he said.

Another mistake people make is to say it's a crime to copy CDs. Williams says copyright breaches aren't technically a criminal offence unless you are selling or distributing the copies.

**William Maher**

*Disclaimer: this does not constitute legal advice. Check with the appropriate legal authorities if an issue specifically concerns you.*

# Give Tux a chance

Getting politicians to fight Microsoft isn't easy, with calls for open source laws rejected.

How do you convert the collective obsession of millions of worldwide Linux and open source experts into something politicians can understand? As passionate Linux fans attempt to shift their battle with Microsoft out of geekdom and into the mainstream, they're finding that not everyone is warming to the underdog's message.

Advocates scored a huge coup recently when the ACT passed a law advocating the consideration of open source software in government contracts. But similar success at state or federal level looks doubtful.

Both the Liberals and Labor say they support open source, but won't support a law giving Linux specific preferences over Microsoft. Speaking at Linux.conf.au in Adelaide recently, MP Andrew Southcott said the Government would remain neutral on the Linux/Microsoft fight: "The Government's attitude is simple. We do not discriminate between proprietary

say that all they like," she said. "I don't believe the Federal government has established that position at all."

Lundy believes the debate is about more than just saving dollars. She cites important issues like ensuring that today's files are compatible with future systems, something she says will be ensured with open standards. But while Lundy and other open source backers say there is much at stake, finding a way to get the point across is proving difficult. "Once you start to talk about software kernels you lose people," she said.

Sending a clear message is a problem for open source advocates as they join hundreds of lobby groups with agendas ranging from the environment to gun control, farming and indigenous rights. "It's a big challenge as to how to present their credentials," says Lundy. "There's an understanding now that they need that clear message."

## Getting the point across is proving difficult . . . once you start talking about software kernels, you lose people

or non-proprietary software on ideological or philosophical grounds."

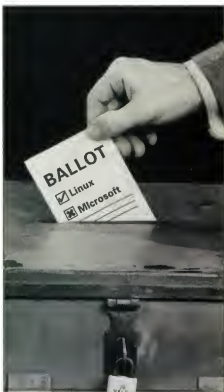
Shadow IT minister Kate Lundy is also against specific preferences for Linux, but does agree the Microsoft and open source situation is extremely unfair. She argues there is a concerted effort to "lock-in" proprietary technology for big contracts, and disputes the Government's claim it is neutral. "They can

The gulf between this open source community and the outside world was no better demonstrated than at the Adelaide event, where Linux founder, Linus Torvalds, made a surprise appearance. Despite being a software idol, Torvalds barely made a blip on the media radar when he arrived.

Open source enthusiasts acclaim Torvalds as a sort of spiritual arch-rival to Bill Gates, but the media profiles of the two couldn't be more different. While Microsoft's founder is a household name, topping rich lists and being accorded statesman-like status among world leaders, Torvalds' claim to fame in Adelaide was taking part in an old-fashioned dunking contest, where competitors tried to get him wet by throwing balls at a target.

At Linux.conf.au, Torvalds commented to a reporter that it could take five to 10 years before "normal users" start seeing Linux on the desktop. Torvalds' comment follows others' recent doubts about the widespread appeal of Microsoft alternatives in the home.

CEO of Linux vendor Red Hat, Matthew Szulik, raised eyebrows with the suggestion



► **Linux' Law:** this two-party system has a clear winner.

Windows would be a better fit for some home users, and that Linux "needs to mature".

The comments caused a mini-storm among some Linux diehards, who believe it represents a move away from the long-held dream of challenging Microsoft's position as a household name. Fuelling concerns are moves by key Linux distributors to focus on the corporate market.

Late last year, corporate vendor Novell announced it was taking over SuSE Linux, while Red Hat has recently decided to cease support for its consumer Linux product (see "Red Hat's switch"), instead focusing on its Enterprise edition. "You can see how quickly he has sold out the dream of Linux on everything," complained one Slashdot poster about Red Hat's Szulik.

Meanwhile Microsoft shows no signs of weakening, posting a \$30 million profit in Australia for the last financial year. This included \$261.5 million in revenue, a 14% increase over the previous year.

The software giant has launched an advertising campaign directly aimed at countering interest in Linux, including a Web site called "Get the Facts on Windows and Linux". The site includes statistics and lab reports arguing that Microsoft products provide better value and out-perform Linux.

**William Maher**

## Red Hat's switch

Next month marks a significant watershed in Linux's evolution, with its leading vendor ceasing support for its free version of Linux. Does this mean Red Hat is abandoning the hobbyist OS community?

Not quite. Hobbyists can still sink their teeth into the same warts-and-all version of Linux; it's just under another name — The Fedora Project. The project is aimed at "high-tech enthusiasts" who want to get their hands on cutting edge code before it appears in retail products. Visit <http://fedora.redhat.com> for more info.



# Exchange: John Watts

**As the new head of Australia's Interactive Entertainment body, John Watts is dedicated to spreading the word that the games industry isn't child's play.**



With exports of over \$100 million, and retail sales almost nudging the \$1 billion mark, Australia's games market has become a significant contributor to the local economy.

With the gaming industry's "coming of age", the heads of Australia's games development companies have formed the Interactive Entertainment Association. And vice president of Activision Asia Pacific, John Watts, was recently elevated to the top job.

He comes into the role at a point where all eyes are on the industry. Debate over copyright enforcement both in and outside the industry has been heated, while the gap between film and interactive entertainment industries keeps narrowing. And it's the policies the IEAA takes now that will define the body in the public eye. APC spoke to Watts about the organisation's goals in 2014 and beyond.

**The music industry seems to have accepted online distribution as a reality. What is the IEAA's position on the issue?**

I read with interest that a company has started up that has the support of least a few of the

**In what concrete ways does the IEAA help the industry as opposed to merely serving its members?**

In the short time the IEAA has existed, we have made representations to government ministers on the needs and the challenges that face our industry to do with piracy, classification of games and intellectual property issues. We also have a vested interest in the FTA [Free Trade Agreement] process and have been involved in briefings.

Adam Lancman, president of the GDAA [Game Developers Association of Australia] has a very strong relationship with the IEAA. Mr Lancman and representatives of the IEAA conducted an event in Parliament House during 2003 which was specifically designed to highlight and educate government personnel and ministers alike on the depth of talent and the variety of game content that is developed within Australia.

Our relationship with local developers also goes quite deep. Many of the association members are global publishers that are in fact utilising Australian development talent

supports the R rating for game content. We understand this matter will take another two years before the government will [make] any revision of the classification system, [but] it remains on the IEAA agenda.

**Will you lead debate towards PC game piracy as well as the more higher profile actions against console piracy?**

The issue of piracy is not specific to console-based titles, however it is true that... this battle has been weighted towards the more high profile platform holders. We are currently discussing within the IEAA how to balance this for the future.

Piracy continues to be the major challenge that the industry and the IEAA face that impacts growth. Recent data indicates that 18% of Australians would knowingly purchase a pirated copy than the original version. Over 40% would purchase a pirated "copy" if, in fact, it were 75% cheaper than the original version. The software and games industry lost over \$667 million in sales to counterfeiting in 2002. We continue to lobby the government aggressively for stricter penalties on convicted pirates, as the current penalties handed down remain insufficient to deter the practice.

**What is your assessment of the Federal Government's involvement and awareness of the interactive entertainment industry?**

The best example that I can reference as to the awareness, effectiveness and the success of the IEAA to date is via the joint press release that Daryl Williams and the Attorney-General, Philip Ruddock, released on 10 December headed "Help Push Pirates off the Christmas Gangplank".

**How much influence over IEAA policy do large retail outlets have?**

The large retail outlets don't influence IEAA policies. We have independent relationships with large and small retail outlets as platform owners and software publishers.

As the association is maturing, the objectives and comments of the retailers is very much a topic of discussion as to how we can best use their expertise to contribute and improve the association's objectives.

**John Watts spoke to Justin Kranz**

## The challenges facing [the games] industry are piracy, classification and intellectual property issues

music companies relating to legal downloading of music tracks. Downloads costing just \$1.99 per track is a new phenomenon that we will monitor with interest. However, expectations of profitability [in ventures such as this] seem to be limited in the short term.

**Do you think our telecommunications infrastructure and pricing are conducive to a local online games distribution model?**

It is timely that Telstra and Optus are both reviewing their pricing models within the Australian market. With Telstra aiming to have 1 million subscribers by 2005, this will assist in that plight. Australia remains ranked 29th on a table of 30 countries in terms of broadband subscribers per 100 inhabitants; this in itself doesn't indicate that the current infrastructure is deeply [benefiting] the gaming community.

to develop game content for local and international release.

**What moves will the IEAA take in relation to pursuing an R rating for videogames?**

Game content continues to converge with movie-based themes and technology is allowing for more detailed computer graphics. Currently the games industry has a maximum rating of MA15+, which we believe is restrictive in relation to the style and story-based game content that is now being produced.

We made representations to [Minister for Communications, Information Technology and the Arts] Daryl Williams when he was the Attorney-General, and expressed our disappointment to the government decision to reject the opportunity for an R classification to be applied to interactive games as the IEAA

# Who ordered small?

The new wave of mini digital media players is great news for hard drive makers.

At first glance they could be mistaken for a CPU wrapped in fancy packaging. But instead of millions of transistors they contain billions of bytes, stored on a disk the size of a 10-cent coin — and you'll probably find one inside your next MP3 player.

Welcome to the world of super-tiny hard drives. After more than 20 years churning away inside desktop and notebook PCs, with capacities growing as fast as the dealer's margins shrink, hard drives have become little more than a commodity. Now they're breaking free and taking on fast but expensive flash memory in the portable player market.

Toshiba set the pace in 2000 with a 2GB 1.8in disk drive, and while it achieved modest success as a portable PC card hard disk sold to road warriors, the drive realised a rich new vein of business in late 2001 when Apple chose the card as the storage medium for the iPod. Two million iPods later, and Toshiba is prepping a 0.85in drive with 4GB capacity. Samples will roll off the line in the middle of the year, with commercial shipments due in early 2005 for an estimated US\$280. The company believes the drive will find a place not only in MP3 players but in digital cameras, camcorders to mobile phones, GPS receivers and even TV sets.

► **Mini magic:** MP3 players such as Creative's Nomad MuVo<sup>2</sup> take full advantage of the tiny drives.



► **Land of the giants?** No, it's an itty bitty, teeny weeny disk drive.

But Toshiba isn't alone in crafting a new wave of miniature bit buckets. A flood of similar drives is on the way, according to analysts Coughlin Associates. Shipments of sub-1.8in drives are predicted to increase from 3.3 million in 2003 to 27.3 million in 2008.

Hitachi Global Storage already owns a slice of the "embedded drive" market thanks to the Microdrive, which it inherited from IBM when it bought their storage arm at the start of 2003. The 1in platter drives Creative's Nomad MuVo<sup>2</sup> portable audio player and is also believed to power Apple's new iPod mini, though neither Apple nor Hitachi are willing to comment on the OEM deal. Hitachi Global Storage's 1.8in Travelstar, with 20GB and 40GB capacities, can also be found inside prototype Portable Media Centers from Creative and Sanyo as well as Dell's MP3/WMA player (not available in Australia at the time of writing).

While Apple's iPod and Microsoft's Portable Media Center (see Shipping News, page 32) offer a new lifeline to hard drive makers, they are in fact made possible only by breakthroughs in magnetic disk sizes and techniques to increase the memory density. Other tricks include removing unnecessary electronics, shrinking the size of the disk head, and closing the gap between the head and the spinning platter.

Until recently, media players

have relied on expensive flash memory chips, which have a relatively low memory ceiling and a subsequently high cost-per-megabyte. Old-fashioned magnetic hard disks are enjoying a new lease of life for their cheap technology, robust operation and higher capacity. There's room for both on the field, said Hitachi's John Outerhouse, but it's a matter of matching the technology to the target product: "Flash is for megabytes, hard drives are for gigabytes."

Like all nascent markets, new players are jostling at the starting grid. Storage upstart Corncore — formed by alumni of Maxtor, Quantum and Seagate — debuted its 2GB 1in "Storage Element" at this year's Consumer Electronics Show in Las Vegas. It's a miniature drive with a difference — stripped to the barest of essentials. This includes removing the cache and even the ATA interface controller chips, which must be supplied by the OEM. The upside: Corncore can sell the 2GB unit for US\$70, in turn allowing hardware partners to hit what many consider to be the magic US\$199 price point for consumer devices.

Another newcomer is GS Magic, a Chinese firm strategically located on home turf of the world's PC manufacturing hub. GSM specialises in what it terms "mobile and mini-mobile" drives, with its 1.8in 30GB and 1in 4.4GB units already rolling off the line. These capacities are slated to hit 40GB and 10GB respectively in the coming year, with a 0.8in disk planned for 2005.

William Maher and David Flynn



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# And the winner is . . .

Like amateur mad-professors, they spend their lives tinkering with computers. Look on in awe at these pointless geek records.

## STRENGTH IN NUMBERS

What possible reason could anyone have for clustering together thousands of CPUs into one virtual super-PC? For the group that harnessed the power of 211,000 computers recently, the goal wasn't anything like the search for ET or solving complex engineering problems — they just wanted to make a really, really big number. In fact, they broke at the world record for finding the largest prime number, a whopping 6.3 million digits long. So what if it's largely academic — it's big, okay?

## GIGAPIXEL PERFECT

Deciding he could make 6 megapixel cameras look like child's toys, Max Lyons has created what he claims is the first 1 "gigapixel" image. Actually created by stitching together nearly 200 separate high-resolution shots, the resulting image is so monstrous only small slices are available for download on his Web site: [www.tawbaware.com/maxlyons/gigapixel.htm](http://www.tawbaware.com/maxlyons/gigapixel.htm).

## LOS ANGELES HOT SPOTS

The lure of free Internet is hard to resist, but some people set a new record for effort when they went scanning for unsecured wireless networks . . . from a light aircraft. From 1,400ft they were able to find more than 2,000 access points, nearly three quarters of which had no encryption. They even plotted the results and posted them online: <http://quickwired.com/kallahar/stories/2003-Dec10/warflaying.php>. Useful — if you happen to be cruising at low altitude over Los Angeles with a laptop.

## TAKE THE OTHER PILL

Hankering for *The Matrix*? The series may be over, but old-school ASCII artists are keeping the dream alive. Someone with way too much time on their hands has created an ASCII version of *The Matrix*, complete with an animated Neo made from black and white text symbols. For those who aren't familiar with the obscure world of ASCII art, imagine pictures "drawn" on screen using nothing more than the symbols on your keyboard. Last time we checked, ASCII Matrix was still viewable via Telnet at <http://www.genericgeek.com/matrix/ascimatrix.html>.



## Data Dump

Number crunch

Growth in global PC shipments during 2003: 10.9% (Source: Gartner)	Top seller during 2003: Dell, with 15% share
Number of hits to official Rugby World Cup 2003 site During first hour of comp: 10 million (Source: Compuware)	Total hits: 495 million
Worldwide shipments of digital cameras in 2004: 53 million (Source: Infotrends Research Group)	Film camera shipments in 2004: 36 million
Number of Telstra jobs at risk of being sent offshore: 1,500 (Source: Australian Financial Review)	Growth in demand for IT executives during December 2003: 37% (Source: EL Consult)

# 100,000

▲ Patents held by Philips, including many mass market technologies like CD, DVD and JPEG. Over the last five years, Philips has tripled the annual number of inventions for which it seeks patents from 1,000 to 3,000.



**"It may have not got the attention it deserves; maybe it's too broad"**

PAUL ROBERTSON, DIRECTOR OF RISK ASSESSMENT WITH TRUSECURE, WONDERS WHY A CONSUMER AWARENESS "COMPUTER SECURITY DAY" HAS FAILED TO EXCITE THE PUBLIC. THE EDUCATIONAL DAY WAS CREATED IN 1988.

Quote file

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# Out of the shadows



As Australian anti-spam laws come into effect next month, **William Maher** reports on the real state of the junk mail box.

*"We're coming to get you ... you have made me lose everything. I have nothing left to lose except my freedom ... your death will be worth it."*

*Message from alleged spammer to anti-spam campaigner Matthew Sullivan*

Death threats may not be the first thing to mind when you think of spam email. However, they're now all part of a day's work for junk mailers battling increasingly hostile opposition from Internet users and legislators.

Slowly but surely the tide is turning as more ISPs ban spammers from their networks and cut off their means of operation. This April, new anti-spam laws come into effect in Australia. For the first time, the worst corporate junk mailers could face fines as high as \$1.1 million per day, or up to \$44,000 per day for individuals. But there's a bug in the plan, represented by some of the Internet's most notorious mass emailers.

Moving from network to network, flooding inboxes with junk, sending ISPs broke, and menacing all who stand in their way is all in a

day's work for hard-core spammers. It's believed that only 100 or so of these operators are responsible for the bulk of the world's spam — but these few have been reported as sending as many as 250 million messages per day.

With potentially huge earnings on the line, spammers aren't giving up without a fight. Some are launching viruses and Web attacks aimed at their enemies. Even those targeted with multimillion dollar lawsuits are so far vowing to continue hitting the send button.

"They're still using proxy servers to hide their tracks and installing trojans on people's machines," says Matthew Sullivan, who has been watching their exploits for the past three years for the anti-spam site SORBS (Spam & Open Relay Blocking System). There are only around three top spammers he knows of based in Australia, including the one who sent him the death threat.

## IT WASN'T ME

US-based Scott Richter is number three on the list of the world's biggest alleged spammers. He's believed to be responsible for sending 250 million spams a day and collecting "several million" dollars a month in profits. He and other defendants have allegedly hijacked the Web servers of schools, hospitals and businesses for junk mail runs.

Richter is also in the firing line of Bill Gates. Gates has publicly stated that he aims to "eliminate the torrent" of spam, and so Microsoft, in conjunction with the state of New York, has set its sights on Richter with a multimillion dollar lawsuit. The company has even hired a former US Marshal Border Patrol officer to hunt spammers down.

Looking at Richter's Web site, you wouldn't suspect a thing. Complete with a professional logo and slick design, the OptinRealBig site could be just another online marketing firm. There was even a message describing the lawsuit as "one of the worst orchestrated smear campaigns against legitimate Internet business interests of recent times."

Richter himself appears to be defiant in the face of a legal pounding. "We intend to fight it and it's not going affect us," he told *Wired*. "It's going to take an army [of lawyers]."

One reason high-profile spammers are confident they can stay in business is the US' new "Can Spam" Act. Instead of shutting down people like Richter, some say the law is giving them a gigantic legal loophole. Rather than banning any unsolicited mail as Australia

has done, the US law allows "opt-out" spam, meaning the junk mail can continue as long as receivers are given a working unsubscribe button, and other conditions.

"In 2004, I think you're going to see a lot more spam," states Sullivan. "All of these spammers are still going to operate illegally. They're not going to use their real addresses, but they're just going to quote that law and say, 'we can send you that spam because we've got this opt-out link.'"

#### EVERYONE'S A LOSER

In recent years, anti-spam lawsuits have been initiated by everyone from AOL to Compuserve, and a multitude of ISPs in between, with hardly a dent in world spam levels. But spammers are tougher to stop than Microsoft thinks, says Sullivan, no matter what they say about the results of the latest lawsuits.

"[The lawsuits are] a great thing for Microsoft and AOL, but it doesn't help the old end users who are getting spammed. It's just a big publicity stunt. In the UK, they've actually said yes, people can go to jail for spamming."

## Lawsuits have been initiated by a multitude of ISPs, with hardly a dent in spam levels

Has it stopped them spamming people in the UK? Like hell.

"There's too much money to be made [by spammers]. With this law in hand [in its current wording], they've now got even more [tools with which] to go to companies and say 'we can do the spamming for you, [and] we'll be completely compliant with the law.'"

Even the retirement of the world's number one "Spam King", Sanford Wallace, hasn't had any effect on the volume of spam reaching inboxes. At his peak, Wallace was said to be responsible for 25 million emails per day, but it took years of lawsuits and threats to make Wallace give up spamming. As Wallace told *Wired*: "They won, and I'm the first to admit it. But [spam] has turned into a bigger problem, despite their efforts."

#### HIT AND RUN

It doesn't help that spammers have found numerous ways to cover their tracks. Helping them avoid detection are dialup accounts, which are usually quicker to set up than broadband. Spammers might have four or five

PCs with Windows 95 and spam software, each connected to two modems.

Stolen credit cards are often used to set up temporary ISP accounts which are used for brief two-day mail bombings. By the time the ISP realises what is happening, the spammer has usually moved on. "We're talking dumping a million email messages within 24 hours, no problem at all," claims Sullivan.

Over time, the spammers have earned themselves a long list of enemies. In one case, an ISP went bankrupt after a spammer racked up a huge bill while mail bombing, then walked away without paying, he says. Sullivan believes the victims are waiting for the day they can exact their revenge: "There are a lot of people out there who really don't like this guy and keep an eye on where he's going. They're good people that he's stitched up... One reason I can track him so well is that I know so many people [who know about him]."

Some spammers have earned distinctly shadowy reputations, fuelled by reports on sites like Spamhaus, the Internet's equivalent of the FBI's Most Wanted list. Included on this

list are bizarrely named groups such as the Australian Porn Mafia. Sullivan says some of these groups make as much as \$7,000 per day from bombarding inboxes.

#### STEALTH ATTACK

Junk mailers are now upping the ante against ISPs, using increasingly sophisticated techniques such as viruses to spread mail. They have also attacked the Spamhaus anti-spam group with several versions of the Mimal mail worm.

"These guys write trojans [viruses], they carry out DDOS attacks, and they get their money through selling stolen credit cards and spamming," Spamhaus founder Steve Linfoot told Reuters.

Trojans make it appear that a large proportion of mail now originates from "innocent" home PC users. Using viruses, spammers can infect host computers and use them as relays for mass mail floods. Antivirus company Sophos claims a third of all spam now comes from these infected PCs.

By some accounts, network providers like Telstra have thousands of open relays on their

servers, each capable of spewing spam. The reality is that new laws won't directly solve the problem. Internet Industry Association president Peter Coroneos says the problems created by these hijacked PCs aren't dealt with by the Australian spam law. "At best, it would be a breach of the industry code," he explains.

There are also unsubstantiated rumours that spammers have some ISPs onside, exploiting their mail servers in exchange for payments. Paying for bandwidth can be an expensive business, something that an ISP in financial difficulty might find hard to ignore.

This is a frustrating situation for people like Sullivan who badly want to catch spammers. He complains that the opportunity to turn the tables against them is being wasted.

All the same, after chasing spammers for years and coping abusive emails and a death threat, Sullivan still dreams of visiting the same pain upon them. He says he even has a particular offender in mind: "As soon as the law takes effect, I'm just going to nail him. I'm rubbing my hands together for that one." <http://www.etc.co.uk>

## Bag a spammer

While authorities say they'll try to avoid court action under new the new Spam Act 2003, big fines await hard-core spammers who get caught. Also covering SMS mobile phone messages, here are the new rules, so you can bag some spammers:

#### WHAT'S BANNED:

- unsolicited commercial mail
- commercial mail without a working unsubscribe option

#### THEIR PUNISHMENT:

- up to \$110,000 per day for corporate infringements, \$1.1 million per day for repeat offenders
- up to \$44,000 per day in penalties for offending individuals

#### WHERE TO GO:

- the Australian Communications Authority (ACA) is setting up a spam team to investigate complaints. Visit [www.aca.gov.au](http://www.aca.gov.au)
- alternatively, contact your ISP with complaints. You'll need a copy of the spam, including an intact email header

# Virus Wars: **fighting back**



**Following 2003's waves of high-profile virus infections, authorities are working to identify and bring cyber-criminals to justice. David Braue reports.**

As an antivirus researcher within Symantec's Security Response division, Peter Ferrie had seen a lot of viruses in his time. But like many others around the world, he was surprised by the design of the Sobig virus that emerged last August, infecting hundreds of thousands of computers worldwide.

Although new viruses are inevitably identified and resolved by updating virus definition files, by the time users bother to download the new definitions, a virus has already had a considerable head start in working its black magic.

Sobig didn't squander this opportunity: systems were rapidly compromised as it downloaded a remote proxy server called WinGate. This then allowed an external third party to use an infected machine as a relay to send spam emails at volumes of biblical proportion.

The fact that Sobig was bent on proliferating spam, and not on destroying data, suggested that its author — who still remains at large — had gone to great lengths to disguise his/her identity and may well have

been selling access to their global network of zombie computers. The servers from which Sobig downloaded WinGate had been set up to offer the program for only a short period of time; outside these times, they would look just like any other server and offer no clues as to the perpetrator's identity.

Truly novel viruses are few and far between, says Ferrie, but Sobig was definitely one of a new breed of increasingly sophisticated infections that has raised the stakes in the global battle against viruses. "More viruses and worms are installing some kind of back door that does things like steal passwords, log keystrokes, or look for particularly sensitive files," he says. "Combine that with the fact that mass emailing is being used for replication, and you get a widespread collection of compromised machines in a very short time."

After a relatively quiet 2002, 2003 was definitely a watershed year for viruses: attacks by MSBlaster, Code Red, Sobig, Friends Greeting, Klez, Gibe-F/Swen and others infected millions of machines and were blamed for everything from the two-week disruption of Telstra's email

service to an interrupted local government election in Illinois and the blackout of dispatch, signalling and other critical systems on train lines across 23 US states.

Such high-profile infections suggest two things: one, that the threat of viruses remains as real as ever, and two, that virus writers are setting their sights even higher. Authorities now suspect that many malware authors have joined forces with organised crime or terrorists, creating a new "axis of evil" which could pose serious problems for a society in which computers and the Internet have become a fundamental part of life.

## ONLINE ARM OF THE LAW

Authorities haven't been completely helpless in the face of virus attacks: just as graffiti artists often leave "tags" that reveal their identities, virus writers often leave tracks that help investigators trace back up the line to their creators. With virus numbers increasing continuously in recent years, authorities are getting better at identifying these tags and tracing them back to their source.

In September 2003 alone, the US Justice Department arrested a minor in conjunction with the creation of the RpcSpybot-A worm. Jeffrey Lee Parson, an 18-year-old hacker from Minnesota, USA, was arrested on charges related to the Blaster-B worm; a Romanian man was charged in connection to the Blaster-F worm; and a pair of British 20-somethings were charged in connection with the TKBot-A Trojan horse.

A string of other arrests — including the two-year incarceration of 22-year-old British Web designer Simon Vallor for writing the Gokar, Redesi and Admirer viruses — suggests that authorities are finally making long-elusive headway in the fight to track down virus writers who work hard to cover their tracks. Stricter legislation — such as the Australian Cybercrime Act 2001, which makes it a crime even to possess one of the many virus-writing toolkits available online — has finally given authorities the legal backing to treat malware authors as criminals.

Increased legal power saw the Australian Federal Police join the worldwide hunt for virus writers with the creation of the Australian High Tech Crime Centre (AHTCC) last July. The AHTCC was created to enforce amendments to the Criminal Code Act 1995 that were introduced with the Cybercrime Act 2001.

More than 30 in-house agents are handling a range of online crimes, ranging from virus writing to Internet-related fraud, terrorism and other nasties. The AHTCC's team includes more than 30 police and technical experts representing all state police forces, the Defence Signals Directorate, and a variety of other interested parties. AHTCC, which is housed by the Australian Federal Police but operated as a separate unit, also maintains relationships with similar law enforcement agencies overseas.

Although authorities have long been outnumbered in their fight against virtually anonymous virus writers, Nigel Phair, team leader for investigations at the AHTCC is optimistic that the new clampdown on digital-age criminals will produce results. Several cases are currently under investigation, and more are being added every day.

"I'm confident the AHTCC has the right in-house skills and alliances to conduct investigations," Phair says. "We have a number of police investigators who are technically very proficient for virus investigations, and we rely on the advice of the antivirus community to stay abreast of new viruses. But we can't be complacent; criminals move quickly, and we're willing to change our practice as we have to, to

Changes in the motivations of malware authors reflect an ongoing maturation within the underground virus community. Sarah Gordon, an antivirus researcher with Symantec, has spent the past 10 years analysing what makes her company's adversaries tick.

"Years of scientific research have shown us that virus writers are often [behaving] within ethical norms for their ages, get along with others, and have 'normal' social lives," Gordon told APC. "They tend to be at the lower end of the [hacker] social structure, and motivated by (among other things) curiosity and perception of technical challenge. For many young people, there is a fundamental disconnect between 'computer action' and 'human being.'"

If authorities are right, the disconnect has widened even more: Sobig represents an escalation in both the intensity and the potential danger of virus attacks. Yet sorting out the major viruses from the poor ones can be tricky, simply because the sheer volume of new viruses — and their unpredictable spread — makes it hard to know which code is going to be the next Sobig.

Fortunately, many viruses are poorly written, often generated by inexperienced "script kiddies" who run freely available malware-creation programs or haphazardly

is now blindfolded and bound. The latest crop of big-name viruses is a mechanism for waging war on the Internet — on the bad guys' terms. And, with thousands of skilled virus authors out there, it's a battle that seems chronically stacked in the bad guys' favour, even with authorities now treating virus investigation with the kind of seriousness that's previously been reserved for hardened criminals.

It doesn't help that many computer users now become unwitting accomplices to the viruses' spread. Smooth-talking viruses use social engineering (most recently, by purporting to be a security update from Microsoft) to convince users to run their dangerous payloads. To make matters worse, many viruses build on those that have come before, points out Nick FitzGerald, a Wellington-based antivirus researcher and contractor to Computer Associates who previously edited industry bible *Virus Bulletin*.

"If Swen had come out six months earlier, it would have been nowhere near the size and volume that it was," he says. "But MSBlaster taught 250 million people who had never heard the term 'security patch' that Microsoft sometimes releases things that [mean], if you don't put them on your machine, you're in big trouble. When Swen came out [disguised as a nicely formatted security patch from Microsoft] those people were open to it."

Although many viruses are obvious from their poor spelling or illogical premise (Microsoft does not email security patches, for example) subtle social engineering has repeatedly proven enough to trick many users. Phair, like the antivirus researchers and vendors his team works with, hopes that end-user education will help people help themselves, and that effective law enforcement can teach virus writers that there are consequences to their actions.

Can a crackdown by law enforcement agencies really make a difference to virus spread? Since investigations can only be launched in response to an organisation suffering significant financial or other loss from a virus attack, those battling viruses are, by definition, already on the back foot. They are watching, waiting, and trying to predict what the virus writers will do next. With any luck, they'll be able to stay a step behind the authors of the worst viruses. Let's just hope their defences can spot and contain new outbreaks — before you do. **by iD**

## Stricter legislation gives authorities the legal backing to treat malware authors as criminals

conduct investigations. I don't kid myself that it's an easy task, but we have a lot of [resources] at our disposal. I believe we can be successful."

Law enforcement authorities aren't the only ones taking on the virus writers. Microsoft, which has been roundly blamed for viruses' success because of the holes in its software, recently put a bounty on the head of leading virus writers. It may have worked for Mel Gibson in *Ransom*, but time will tell whether the promise of bountiful rewards will convince any fiscally-minded members of the virus-writing community to turn and do bin in one of its own.

### THE HUNT IS ON

In the meantime, authorities hope a crackdown will deter many casual virus writers and point out that it's no longer just a game. If virus writers are becoming mercenaries for hire — paid by criminal elements to infiltrate or compromise global networks — the promise of instant riches will likely spur a new wave of innovation that promises even more interruptions from increasingly sophisticated viruses.

patch together pieces of other viruses.

"Sometimes we see very elegant things," says Eric Chien, UK-based chief researcher with Symantec Security Response, a global team of antivirus investigators that keeps the market-leading antivirus solution up-to-date. "Slammer was a very small piece of code, which let it infect the entire Internet in 20 minutes. But 95% of the time we see really horribly written code that's clearly cut and pasted from different sources by people who didn't know what they were doing. The real problem today is just keeping up with the volume."

Because researchers must find a signature to detect each and every new virus strain, their work is already cut out for them. That creates opportunities for expert virus writers who are likely to flood the antivirus labs with nonsensical decoys, then every once in a while release a real show-stopper that catches authorities unaware. Testing one recent instant messaging virus in a controlled environment, Symantec researchers found it would be able to infect 500,000 systems in 30 seconds.

In this game of cat and mouse, the mouse

**Bonus CD software**  
Trend Micro PC-cillin  
Internet Security 2004 with six  
months of free protection.

with Richard Hogg



## ICT phoenix rising from the ashes

**The ICT industry has fallen on hard times in recent years, but hope is at last appearing on the horizon, as the ACS launches its 2004 Year of the ICT Professional.**

As we enter 2004, ICT professionals are having an increasing effect on the way we work, rest and play. As the recognised body representing professionals working in all spheres of computing, information management and telecommunications, the ACS (Australian Computer Society) has an unprecedented opportunity to influence the handling of technology-related issues.

In a period of high trade deficit and high ICT unemployment, maintaining an active voice for the sector is vital. I have been a strong advocate on three key issues facing the economy: education, employment and professionalism. When we look at these separately, we can identify the problems, along with their possible solutions.

The education of our children is critical to the future economic fabric of our nation. The past two years has seen a dramatic drop in university first enrolments in ICT courses.

This has occurred for a number of reasons, including: the lack of available jobs; a perception of ICT as "nerdy" and offering limited career options (especially for women); and a perception that an industry subject to such rapid and violent change is not a secure working environment. Some of these views are half right; the rest are just local industry myths and ill-conceived community opinion.

Nevertheless, they exist and we must act now to redress the situation. Over the next three to five years, we face a shortage of graduates and increasing retirements from baby-boomer professionals coinciding with a predicted (and likely) upswing in employment opportunities.

three years, the Australian ICT sector has shed over 30,000 jobs, a staggering number in anybody's view.

For the second year, the ACS has sent a detailed survey to its members asking for feedback on the current state of the ICT industry in Australia. By gathering quantitative data from members we are developing a clearer picture of what is happening in the marketplace and how ICT professionals are being affected.

The results of the 2002 survey gave us a stake in the ground. The 2003 results, released in February, will enable us to improve the picture and to further isolate the key problems. We will use the information to work with Governments in Victoria and elsewhere to develop initiatives and policies to stimulate growth in the industry.

In the short term we must encourage and support new views on unemployment, of retirement and on the mature aged. The ACS would like to see measures which encourage companies to retrain experienced ICT staff, in keeping with the "lifelong learning" mantra. We'd also like to see incentives for Australian corporations to encourage major software development projects to be carried out within the country rather than sending them offshore.

Given the drain on the economy of having so many thousands of ICT professionals out of work, there is a case to consider financial incentives to motivate companies to bring back into the country any projects they might have offshore. The financial benefits flowing to the economy from the creation of new ICT jobs would vastly outweigh any short-term costs incurred.

## We must adopt a different approach to ICT education . . . ICT courses should be made mandatory alongside English and mathematics

I believe we must address this problem in the early years of secondary school and will continue to campaign on this issue in 2004. If we are to really become the "clever country", we must adopt a different approach to ICT education, with ICT courses becoming mandatory alongside English and mathematics.

There are very few sectors in the community which don't rely heavily on computer technology on a daily basis. To prepare our next generation of ICT users, we need experienced professionals at the front of the classroom. As we have the resources, let's use them for maximum benefit. This doesn't necessarily translate into a laptop in every school bag; rather, we need a reasoned approach that introduces the real use of technology in everyday living.

The ACS has put a proposal to the Victorian Minister for Education to fund a reskilling project where unemployed ICT professionals retrain to become maths teachers, thereby overcoming the shortage of properly qualified maths teachers and reducing the number of ICT unemployed.

This leads to the next issue — employment. Over the past

Finally, a word or two on professionalism. The ACS has been the leading proponent of ethics and professionalism in this sector since its inception in the 1960s. Our members sign and agree to abide by a Code of Ethics and a Code of Professional Behaviour. In an era of corporate fraud and mismanagement, we must take steps to rectify the situation. We must encourage educators to teach the topics and encourage corporations to recognise professionals and members of a professional society. Lawyers, doctors and accountants are so recognised, why not ICT professionals?

The ACS is doing what it can, with a secondary school curriculum under development, a case study project being finalised, and a seminar for senior executives well into the planning stage. You will see more of these in 2004, the Year of the ICT professional.

*Richard Hogg has just completed a two-year term as National President of the ACS. He continues to play a significant leadership role in the management of the Society.*



Four words

Slim

Bright

Wide



3000



5000



5100



6000



8100

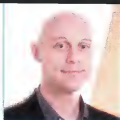
Enjoy the brightest LCD panel (200 nits) of any notebook on the market when you purchase a new BenQ Joybook. Experience unique features on every model such as widescreen formats which are perfect for DVD movies and spreadsheets, you will also be amazed at the stylish slim designs and full multimedia capabilities of BenQ's Joybook range. Experience the difference.

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with Garth Montgomery



## Better dead than red

**Customers and retailers are uniting against shoddy "dead pixel" policies, forcing change on monitor and notebook makers with poor standards and even worse customer service.**

Vendors are revising their dead pixel policies for monitors and notebooks in the face of fierce competition as sour customer sentiment starts to spread. The issue of dead pixels is set to be the number one concern for buyers this year as LCD sales are expected to overtake those of CRTs by December.

APC has been flooded with letters from readers who have either one or a cluster of fat and infuriating blue, green, red or dead pixels on their screens. But vendors are telling them they don't have enough dead pixels to justify a replacement. It's reached the point where customers are hoping that enough pixels will die to qualify for a total replacement (see "Watchdog," page 30).

Sony and Philips led a charge last year proclaiming a "no dead pixel" guarantee on high-end panels. Competitors have slammed these efforts as duplicitous, effectively charging a premium for panels which have the same chance of being defective as any other panel on the market.

Now Acer has raised the bar with announcements in January that if just one pixel dies on any notebook, tablet, or monitor (within 12 months) the unit will be replaced within two hours. No premium is charged and the promise spans all product lines in all sizes.

Prior to this, like other vendors, Acer embarrassed itself by hiding behind doublespeak, minimum dead pixel tolerance levels

vendors. The customer can get no benefit from buying panels with a pixel perfect guarantee. They just pay a premium to offset any replacements after the vendor weighs up how many they expect will be returned."

Freggi says Mitsubishi takes it on a case by case basis and if the dead pixels are outside the ISO standard, they'll replace it, otherwise they keep prices as low as possible.

For retailers facing customers directly, this sort of strategy is a gamble. "The industry standard doesn't go far enough," says David Jones buying agent, Gavin Hooper. "There's an increasing prevalence of retailers dealing with it."

Harvey Norman spokesman Mathew Mitchell says the company is currently working on a formal store policy regarding dead pixels. "The salespeople make customers aware [of potential dead pixels] and push them towards warranties that are more customer-friendly."

The combined pressure on vendors from retailers and Acer's unmatched guarantee coincide with rising prices. IDC analyst Mike Sager estimates wholesale LCD panel prices have risen between US\$5 and US\$10 since last August.

He rejects the notion that prices are rising because vendors are increasingly taking a punt on buying up batches with high failure rates, which are offset by charging a premium for pixel-perfect

## ... a picture of low margin profiteers hiding behind inadequate ISO standards

depending on size and resolution, and tricky ISO standards to get itself off the hook.

If anyone can decipher the 146 pages of ISO 13406-2 ([www.iso.ch](http://www.iso.ch)), let me know. Then apply for a PhD in Smartascanbe. A different standard is applied to always-lit pixels, unlit pixels, sub-pixel defects and the RGB cells making up a pixel. When you add these up, you get the number of defective pixels allowed. And a migraine.

Dead pixels aren't vendor specific. It's an industry-wide issue and pixels are more often than not dead on arrival from the panel factory. Pixels can die over time, but they don't die as a result of usage.

The rate of dead pixels in a manufacturing batch determines the price of the panels. In simple terms, if raw materials for 100 panels are built and only 90 come out with the ISO minimum dead pixel allowance, then the cost of the rejected 10 panels is added to the 90 accepted ones.

As of next month, Diamond Digital is the new brand name for all Mitsubishi electronics. Mitsubishi general manager Richard Freggi is sceptical about any "pixel perfect" claims.

"There are only half a dozen or so manufacturers supplying all vendors. The same panels have the same defects going to all the

product. "Demand is outstripping supply because notebooks and LCD sales exceeded expectations," he says.

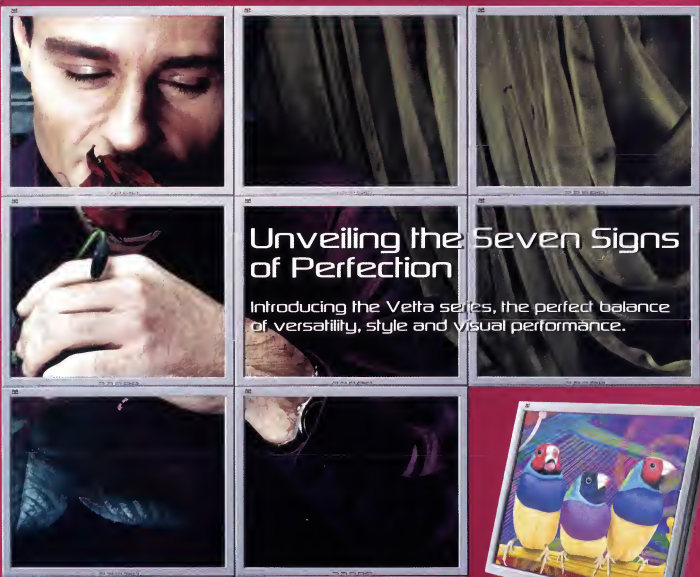
Sager disputes the idea that all panels are the same and says vendors are choosing what kind of panels to sell at tiered grades of pricing. "Yes, all panels mostly come out of the same factories, but some are sixth generation versus fifth generation. Some might have bad pixels and are downgraded to B or C grade for vendors to buy [cheaply]."

Clearly the situation is a woeful indictment on an industry that pays lip service to notions of engineering quality and customer service. Instead, we have a picture of low-margin profiteers hiding behind inadequate ISO standards and putting retailers in a position of holding dummies spat by irate customers. Consumer affairs and fair trading departments are no respite while the ISO standard stands. Changing an ISO standard is laden with more red tape than is relevant to a suburban store with dissatisfied customers.

Customers should demand any LCD product to be demonstrated in the shop, carefully check what the dead pixel policy is for each purchase and vote with their wallet.

Future APC reviews of monitors, notebooks, tablet and handheld PCs will reveal each vendor's dead pixel policy.

[gmontgomery@apcmag.com](mailto:gmontgomery@apcmag.com)



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## Pixel imperfections

As the popularity of LCD monitors catches up with that of CRTs, "dead pixel" stories abound. So, should a "no dead pixel" policy become compulsory?

Dear Watchdog,

About six months ago I purchased a 15in LG LCD monitor. After three days, a still red pixel — a "dead pixel" — appeared on my screen. At the time, I was unaware of what a dead pixel was and thought the product might have been faulty. The warranty card provided no details whatsoever but there was an instruction to ring LG's customer service hotline.

On calling LG — and waiting at least 25 minutes on the line — I finally spoke to a company representative only to be told that they will not accept liability for displays with one dead pixel. The closest I would get to receiving a replacement screen would be if I had bought a monitor which had three dead pixels.

I was angry that my LCD screen was only three days, not three years old, and that not only did LG show no support or offer any other options for replacement or remedy, but it also appeared not to

care about whether or not the product was faulty.

Next, I sent the customer services department an email to double-check the pixel warranty. The reply informed me that the pixel warranty was suddenly down to two pixels.

I now have to live with the fact that I have a red pixel in the centre of my screen, but I remain highly annoyed at the way LG has handled this situation. I am now hoping another pixel will go dead so I can finally get a replacement screen that is in proper working order.

These days all LCD monitor manufacturers should have a "no dead pixel warranty".

Joel Davis  
Gold Coast, Qld

Davis' experience reflects that of many purchasers of LCD monitors. Unless the monitor specifically guarantees no dead pixels, users will often be stranded.



Watchdog approached LG for an explanation of its policy. A spokesperson responded:

LG Electronics Australia's dead pixel policy is in accordance with the industry standard. However, each LG dead pixel replacement claim is assessed according to set criteria. The customer claim must highlight to LG if the pixel is permanently on or off as well as the location of the faulty pixel. LG would be happy to reassess Mr Davis' claim.

While Davis hasn't been alone in experiencing difficulties virtually "out of the box" with new LCD monitor purchases, some APC readers are reporting positive outcomes to this annoying

## Money for nothing?

Dear Watchdog,

When the link to my Web site recently went dead I contacted my ISP, TPG, and was told my account had been disconnected as I hadn't paid in full. But on my credit card statement I found that my payment for three months in advance, beginning end October, had been made by 15 September.

I called TPG's service desk, and gave the necessary information for their accounts department to track down the money, but their representative refused to do anything to help until I sent him my bank statement. My request to speak personally with accounts was refused.

I am left wondering why the date, time and account information for the transaction aren't enough for them to solve the problem and have no other option now but to fax TPG, and run my site on dialup until the problem is resolved.

William Buckley  
Sydney, NSW

Although William Buckley's ADSL Internet Service is currently operational, his email and free Web site server have been disabled due to a payment issue. Mr Buckley last paid for his services on 12 September 2003, which was for his Internet, email and free Web site usage between 30 July and 30 October. Since this payment, we have been unable to debit his credit card. We alerted Mr Buckley via email on 24 October to the fact that we had been unable to bill him, and requested updated payment details.

I understand that Mr Buckley believes the \$209.85 he paid on 12 September was for Internet, email and free Web site usage between 30 October 2003 and 30 January 2004, and that he had paid a quarterly renewal in July 2003. As our records indicate we had not billed Mr Buckley in July 2003, we requested he send us his credit card statement to make sure there was no discrepancy between our records and his bank's. I understand he has provided his bank statement to our accounts department, which confirmed that no payment was received in July 2003. We have tried unsuccessfully on numerous occasions to reach Mr Buckley on his mobile.

TPG does not want to place any blame for these problems. We understand Mr Buckley urgently requires his Web site to be operational and we wish to resolve this problem quickly. This involves TPG Internet being paid for the Internet services.

Jill Chesser  
Technical Support Desk Manager  
TPG Internet Pty Ltd

## Contact us

### WE WANT TO KNOW

how IT companies are really treating you. Write to: [watchdog@apcmag.com](mailto:watchdog@apcmag.com) or PO Box 4088, Sydney NSW 1028.

Include your full contact details and any product information. All correspondence becomes the property of APC and is subject to editing.

problem. Interestingly, the following issue was resolved by the retailer, not the manufacturer.

I recently bought an LG LCD monitor, and found to my horror that there were three very noticeable dead pixels. After spending \$600 on it, I was not going to ignore such defects. I went back to the local Harvey Norman where I bought the monitor, ready for a lengthy fight with a junior representative. To my great surprise, the man simply pulled the monitor out of the box, plugged it in, saw the pixels, and within three or so minutes handed over a brand new monitor — free of dead pixels. This is the way complaints should be handled.

Steven Dargaville  
Buderim, Qld

Stuart Coulson emailed Watchdog to relay a similar story. After purchasing a Compaq laptop from David Jones, he was dismayed to find a bright orange spot in the centre of his screen.

I re-packed everything and returned it to David Jones. The manager got Compaq [on the phone] straight away. The Compaq guy asked how many dead pixels are on the screen, I said one, middle centre. He said "We cannot replace it." According to the warranty there needs to be seven in a square inch before returns are covered.

The manager of David Jones was great. He said, "Don't worry, we will replace it. They have no option but to take it back from us." The only delay was the two days it took to get the same model in for me.

Stuart Coulson  
Stafford Heights, Qld

Next month's Watchdog will update you on the final outcome of Joel Davis' case, but the message seems clear: to avoid wasting time and money, wherever possible get the retailer to demonstrate the monitor in the shop. More importantly, ask the retailer if they will replace the screen immediately in the event of any dead pixels being evident, and for how long they will honour this limited return policy.

## Big Blue's backup blunder

I am setting up a new ThinkPad for a customer. Being aware that IBM doesn't provide an operating system CD with its ThinkPads, and that there is no way of reinstalling the OS if the hard disk fails, I went looking for the suggested method of making a backup CD.

The ThinkPad's installed help files explain there is no recovery CD provided by IBM, and there is no method provided for making one. They simply state that if your hard disk fails, you need to obtain a CD for the purpose from IBM.

I called IBM, which offers this backup CD for \$82.50. However, the company refuse to accept responsibility for supplying backup media for Windows XP or its own drivers. IBM claims the system comes only with a licence to use XP, which doesn't include rights to a media copy.

I believe IBM is being highly unprofessional in failing to acknowledge

the risk of its hard disks' failure, and for failing also to provide backup copies of the necessary drivers to allow reinstallation. Moreover, the only information on these policies is in the help files on the hard disk, which is unavailable when the hard disk itself has failed.

I also believe IBM is being remiss in failing to warn customers at the time of purchase that it does not have the right under the XP licence to receive a backup CD of Windows XP, which costs extra.

Kingsley Burlinson  
Synix computers  
Darwin, NT

Are you caught between servicing customer needs and vendor inflexibility? Let Watchdog know about the issues you face and how you work around them by emailing [watchdog@apcmag.com](mailto:watchdog@apcmag.com)

Dear Watchdog,  
On 30 November 2003, I placed an order with Adelong Computers. On the following day my American Express card was charged to cover its cost.

I've since called Adelong weekly about my order and usually been told it is "almost ready to be despatched".

Eventually, I was informed that most of the items I'd ordered were out of stock and that only a few could be despatched.

I then requested that the available items be sent to me straight away, and that the balance of the cost of the order be refunded to my American Express card.

Since my last call I have not heard from Adelong Computers and my credit card has not been re-credited as requested.

I have today contacted American Express and been told that since all my contact with Adelong Computers has been by phone they can do nothing at this stage. Instead, I have been advised to write to Adelong, and if a solution is not reached by a given date to contact Amex again.

I have also sent an email and a fax to Adelong Computers requesting the cancellation of my order and a refund.

While I am not a lawyer, I'd like to know does selling something that you do not

stock, and may not even be planning to stock, not constitute fraud?

Paul Mason  
Bradbury, NSW

Mason took issue with Adelong charging him for goods that weren't in stock, and its tardiness in refunding him. Stating that companies taking Internet and phone orders commonly charge immediately, Adelong Computers' managing director Julian Kang claimed that this stance was an effort at fraud prevention.

"We've been in operation for 10 years. After our first year as a mail order business, there were so many cases of fraud that we started looking at ways to change the process.

"To confirm that the customer and card are legitimate, we charge the card. This way [in the case of fraud] if the rightful owner contacts us asking about the charge we can take action."

Kang concedes that the policy isn't popular with all customers, but believes it's a worthwhile solution to fraud. "From 1997 we've used the current system, which has been the most successful to date. Some customers do get upset or cancel orders, but we feel it's the most responsible approach."

Mason did get his money back — he faxed Adelong stating that he had reported the issue to American Express. The company rang him immediately with an apology and a refund.



## Show stoppers

No sooner have the New Year fireworks fizzled out and the hangovers ebbed away than the tech calendar kicks into gear with MacWorld Expo and the Consumer Electronics Show (CES). Between them, these geek fests reveal the shape of things to come, from hundreds of new products to concepts and prototypes that won't be made flesh until 2005.

This year's MacWorld in San Francisco was a mixed bag, with the emphasis on "lifestyle" offerings such as the iLife suite, rather than "core" hardware.

Its focal event is the keynote by Steve Jobs, which the faithful see as less a speech than a benediction. As always, Jobs ended with the seemingly throwaway "Oh, there's just one more thing...", before unveiling the big thing — the super-small iPod mini (see right). On the software side, the slick new GarageBand music app features Apple's superb seamless integration of hardware, software and OS. It lets users create music based on 50 instruments or over 1,000 prerecorded music "loops", which you can craft into complete compositions or use as backing tracks when you plug a guitar or keyboard into the Mac.

The dominant theme of Las Vegas' Consumer Electronics Show was connectivity between the PC and the rest of the home. Far from foretelling the death of the desktop, however, the personal computer remains central to the home entertainment equation — ranging from a new role as a living room "media centre" to that of a broadband-connected home hub and content server. And notebooks were in abundance, especially the super-sized wide-screen machines which continue to storm the US consumer market.

## Intel looks beyond the box

Over recent years, Intel has stepped up its efforts in creating concept machines and promoting the "beyond the box" capabilities of the PC platform. At this year's CES, the company had a mock lounge room hosting a "Living Room PC" based on the "Prescott" CPU (see page 40) and "Grantsdale" chipset. With a target price of US\$799, the prototype — constructed by Taiwanese box-builders First International Computer — uses a large-screen TV as the monitor.

In addition to the mandatory digital TV recording, the machine employs Intel's new High Definition Audio spec (previously codenamed Azalia, and intended to replace AC'97) that supports eight audio channels. This can either run as 7.1 surround sound or be split into separate feeds of 2 + 2 + 4 channels. More novel is the integrated wireless access point capability built into the Grantsdale chipset, which lets the device act as a zero-config server to help jump-start the proliferation of wirelessly connected devices around the home.

Continued under gatefold ➤

# Shipping News

## Mini me

Roughly the size of a compact mobile phone, the iPod mini packs 4GB of tunes onto a 1in Hitachi drive. Hand-me-downs from the classic iPod include the elegant interface (but with the buttons integrated into the navigation wheel); the 30-pin connector, which allows the mini to enjoy most standard iPod accessories; and a 32MB SDRAM chip to buffer music spooled from hard disk, providing skip protection and allowing the hard drive to power down more often, thus extending battery life.

One win for the Windows crowd is that the mini comes with both FireWire and USB cables, both of which can recharge the Lithium-ion cell for another eight hours of music on the move.

Aussie pricing hasn't been announced, but APC is tipping it at around the \$350 mark when the iPod mini hits the shelves sometime in April.



## Beta beat

Beating the beta drum at MacWorld was Microsoft's Office:mac 2004. After a soporific press session starting with The Complete History of Microsoft on the Macintosh, the demo team showcased some of the key features of the Office suite.

A new Entourage "Project Center" view groups together contacts, appointments, email, tasks, files, notes and clippings related to each project. Projects can be shared between Office users via a server or a .Mac account.

Word gains a Notebook Layout view that borrows from the Windows OneNote and Tablet PC's Journal apps. This includes a legal pad appearance with ruled lines and tabs down the right hand side, an outline-based structure with flags and icons, embedded Entourage tasks, and audio recording. There's also a Scrapbook for storing a library of often-used items (such as images, logos, charts and tables) which can be easily added to documents.

Beancounters will appreciate the auto-fit feature in Excel, which resizes spreadsheet tables and charts to ensure they neatly fit onto a single page.

To circumvent the problems of Office documents sporting features which aren't supported in other versions or different platforms, a Compatibility Report checks compatibility with older or cross-platform versions of Office. If it detects a feature which may not translate to that "other" Office, it advises what the problem is and how it can be fixed (in some cases, by using a different feature to achieve a similar result).

On top of the standard suite and an educational version, a Professional bundle will be accompanied by Virtual PC 7.0 for the Mac and a Windows XP licence. The finished product is set to ship by mid-year and pricing will be as that for Office X.

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## Look Mum, no wires

Piping PC-based content around the home was a hot theme at this year's CES, and Netgear's MP101 (US\$159) typifies the new solutions to get those MP3s streaming through your stereo. Its compact box connects to any stereo system, aggregating all MP3 and WMA tracks from all PCs on the wireless network into a single database. A remote control lets you drive the process, including selecting playlists built around standard ID3 tags. In addition to sourcing music, Netgear is also spruiking the MP101 as a way to enjoy Internet radio in the living room. Head over to [www.netgear.com](http://www.netgear.com) for more information.



► **Sound solution:** Netgear gets the party started.

## GameBoy meets PDA

While everyone's creating combo phone-PDAs to win over the business market, TapWave (www.tapwave.com) has the grown-up gamer in its sights. The Zodiac handheld has been on the US market for several months, but the device is expected to head down under in the second half of 2004.

The Zodiac takes advantage of the popularity of the Palm OS platform for games, ranging from thousands of original offerings to emulation versions which turn any Palm handheld into a GameBoy.

Sure, it has standard organiser functionality, but this is a device for serious downtime. The 480 x 320 half-VGA display has superb clarity of colour and motion, built-in Bluetooth for multiplayer gaming, a vibration rumbler and game-friendly controls, including a 360° analogue dial and two triggers.

The built-in speakers are complemented by a headphone jack that's ideal for MP3 playback, with two SD card slots for expansion, and SDIO accessories. The powerplant is Motorola's 200MHz ARM9 matched to an ATI Imageon graphics chipset. The 32MB Zodiac 1 sells for US\$299, with the beefier 128MB Zodiac 2 at US\$399.



► **Shining star:** the PDA has never been so much fun.

## No flash in the pan

Among the myriad variations on the flash memory theme spotted at CES (including memory keys in transparent cases topped by pulsating blue LEDs) was the NexGenS (www.efx.com.au), which rolls together almost every conceivable flash-based function.

Starting from \$349, the unit works as a conventional USB memory drive with digital voice recorder and FM tuner. And not only can it play MP3 and WMA tracks, it can rip them from a direct CD input. A SD/MMC card slot lets you boost the memory beyond the built-in 128, 256 or 512MB.



► **NexGenS:** a flash card with a difference.

## Go-anywhere NAS

Network-attached storage (NAS) boxes don't need to be big and bulky. And now they're not restricted to the realm of big business. The NetDisk (from www.ximeta.com) is a portable hard drive that's also network-aware, so you can plug it directly into an Ethernet port for instant NAS. That makes it perfect for shifting and sharing large files throughout an entire workgroup. It also works as a standalone drive hooked up to a single PC or Mac through the USB 2.0 port. Prices start at US\$149 for the 80GB NetDisk, through to US\$219 for the 160GB model.

## Netscape for newbies

How the mighty have fallen. After spinning off from Mosaic, Netscape kicked off the Web revolution, the dot com boom and the "browser wars" with latecomer Microsoft. Its parent was one of the many darlings of the dot com era. Now the once-mighty browser has been relaunched as AOL's base-level dialup service.

While AOL focuses on content-rich broadband experience, its new Netscape service will plumb the market for users seeking unlimited dialup and nothing more. Bearing the tagline of "Just the Net you Need", and with a monthly charge of US\$9.95, it includes an @netscape.com email address accessible through a Web-based email service. All that's left is the Netscape name... the service relies on the user's own browser.

## Mo' memory

Following last year's announcement of the new Memory Stick PRO format, which breaks the old 128MB limit imposed on single-chip slabs, SanDisk (www.sandisk.com) — co-developer of the PRO spec — has announced a 2GB Memory Stick PRO. Expected to command an equally whopping US\$1,000, at least SanDisk is rolling its own Memory Sticks rather than rebadging Sony products.

# Media on the move

Last year's CES, Bill Gates announced Microsoft's concept "Media2Go" platform: a portable media player with hard drive, colour screen and PC smarts for playing music and video. This year we saw the first fruits of the project, with demonstrations of the prototype devices now known as Portable Media Centers.

As with most of the company's other hardware initiatives, Microsoft is setting the reference platform which vendors use as a blueprint for their own devices. The PMC's building blocks are Intel's XScale PXA255 CPU (scaling from 200MHz to 400MHz) with a minimum 20GB hard drive, although most of the pre-launch partners are leaning towards 40GB. The OS is based on Windows CE.NET, and is flash-upgradable to allow support for new codecs. Content is transferred via USB 2.0 and synchronised with Windows Media Player.

Microsoft's Windows Media 9 is the default audio and video format, although PMC devices will also support MP3. Curiously, still photographs can be viewed not only in JPEG and TIFF but also the hitherto unknown "Windows Media Image" format.

Creative's pocket-sized Zen Portable Media Center looks to be the poster child for the PMC push. It weighs a mere 400g, has an impressive 3.5in screen and a battery life rated at three hours for watching video, or 12 hours for music playback (with the screen turned off). It's due for US launch in second half of the year, with a target price of US\$500.



## Pole position

As part of the sponsorship deal in supplying IT gear for the Scuderia Ferrari F1 team ([www.acer.com.au](http://www.acer.com.au)) has produced the new Ferrari 3000 notebook decked out in the manufacturer's official red, offset by metallic silver.

The speed-oriented specs centre on AMD's Athlon XP-M 2500+ mobile powerplant, ATI's Mobility Radeon 9200 GPU with 128MB of DDR-RAM. Other high-tech specs include a wide-screen display, 802.11g wireless, Bluetooth, four USB 2.0 ports, a 60GB removable multi-format DVD burner and a built-in memory card reader. The \$3,299 Ferrari 3000 also includes a matching mobile mouse that's emblazoned with the famous Ferrari logo.



## Game on!

It might look like a home gym, but this is no pec deck — it's a GameDeck ([www.thegamedeck.com](http://www.thegamedeck.com)). With a few flicks and swivels of the extraordinary metal skeleton frame, the GameDeck goes from being a conventional PC workstation to an arcade-like shell perfect for racing games or a flight sim-friendly cockpit.

The PC itself can be tucked away under the sculptured seat — wiring looms carry the cables to the display, controllers and front-facing speakers (rear surround sound speakers can also be clamped to the top of the chair).

While only a prototype at this stage, judging from the long queues of CES attendees eager to take it for a test drive, the GameDeck could be just the ticket for the gamer with everything (except a life). The final price is expected to be close to \$10,000 locally. In other words, if you have to ask how much it costs, you can't afford it.

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## Where's the iBook?

I can't believe your February "student notebook challenge" didn't even mention the Apple iBook.

I bought a 12in iBook early last year and fell in love... it was invaluable in helping me complete my electronics engineering honours. Not only is OS X (with default apps) a gadsend, but you can easily chuck an iBook (or compiled-for-OS X Linux apps) as well.

The basic beauty of command line ssh and sftp (read: easy peasy backups), added to my wireless card and the uni network, cannot be underestimated when study stress takes hold.

Then of course the fact that the casing is indestructible (and sexy), it's tiny, light, the battery lasts forever (five hours or so), the charger is small — connect the video adaptor and say my presentation-is-better-than-yours.

The hard drive is well-sized, the ports are easy to access, and the new iBooks have G4s and slot-loading drives. You can beef up the RAM and add an Airport card, and you're still likely to end up under \$2,000.

My uni notebook has all but replaced my desktop machine. Need I say more?

**Tamara Fehlberg**  
Shentau Park, WA

What can we say, but "Mea culpa"? Where there are same schools, colleges and universities which prefer Windows notebooks to the Apple platform — claiming a desire for consistency in their IT landscape in issues such as support, file compatibility and the need for students to run some course-specific applications — we should have drawn attention to the iBook.

It's a superb piece of kit, especially the nimble 12in unit. The keyboard is a dream, which means a lot when you're hammering out the essays, and you get the elegant Unix-based OS X Panther (which won our 2003 Technology Award for Best OS). For a starting price of \$1,899 (and that's

before a student discount of between 6% and 10%), it's definitely worth a look. The only thing to check is that your place of study and course requirements are Apple-friendly.

### SPAM ERODING EMAIL'S LEGAL STATUS?

After reading Mr Quayle's letter (APC January, page 30), I have to put in my two cents worth. He puts forth a strong argument

about people self-managing themselves properly. However, he misses one point which has caused many people to question the validity of using email as the primary method of contacting clients with important information.

The point is this: with the huge amounts of spam being generated, some legitimate mail does (not may, does) get lost. People will have to set up anti-spamming software properly, and hope to hell that they have "trained" it correctly. Even assuming the anti-spam software is set up correctly, there is still a fair chance that legitimate mail will be incorrectly marked as spam. In addition to this, most people will clear out their spam folder after giving it only a cursory glance, thus deleting

legitimate email.

ISPs (and companies) who argue that email is a sufficient warning, completely fail to realise that their messages may not be actually getting through to their client at all. Relying on email can, at present, be likened to writing a message then placing it in a bottle, writing an address on the label and throwing it into the ocean, hoping that the message will find its way to the client. Warnings and such are only effective if they actually reach their intended recipient.

It may be that until the spam issue has been sorted out once and for all, we will have to revert to snail mail for important (read, legally binding) communication.

**Darrin Smith**  
Duneraig, WA

## Letter of the month

There is one thing that irks me about Linux more than anything. You download an upgraded piece of software only to find it won't install on your system because you need a newer version of glibc or some (other library). If you install that, half your system stops working until you download updates for the other software, or install a complete upgrade of the OS.

It should be relatively simple for developers to avoid this by building in backward compatibility and not changing APIs unless they leave existing functionality alone and introduce new functionality as new API entry points. Professional software engineers know this, and Windows has used this principle for years. This is something Linux developers need to get their heads around if they want to put the system on desktops. Imagine if you had to install a new version of Windows every time you upgraded some third-party software?

I like Linux, but it's a system built by geeks for geeks, and won't be ready for the desktops of the world until it's built for non-geeks.

**David Noakes**  
Brisbane, Qld

David cited WardPerfect's chequered upgrade history and OpenOffice's demanding compatibility regime as two classic examples to back up his point. For his letter of the month-winning submission, David wins Logitech's Cordless MX Duo. Priced at \$229.95, the wireless desktop should come in handy for reinstalling those errant Linux packages.



*Has spam destroyed email's validity as a legitimate business communication? Have you ever simply not received or had delayed emails requiring you to take action? Let APC know at [apc@apcmag.com](mailto:apc@apcmag.com)*

#### NUMERIC STANDARDS WOULD BE HANDY

I don't think the suit against computer vendors over supposedly misleading use of the terms "megabyte" and "gigabyte" (APC January, page 15) is justified. The trouble is, there has never been any consistency in the computer industry over the use of the standard scientific powers-of-1,000 prefixes (kilo, mega, giga and so on) to stand for binary (powers-of-1,024) multipliers versus decimal ones.

The only way to get rid of it is to use the terms consistently. That means sticking to the standard powers-of-1,024 meanings for the standard scientific prefixes (as the hard drive vendors have already been doing), and adopting the official powers-of-1,024 prefixes where you specifically want to refer to powers of 1,024.

Result: no more confusion about exactly what you mean. Sure, it may seem a bit strange at first, but it's better than a lawsuit, isn't it?

**Lawrence D'Oliveiro**  
Hamilton, New Zealand

#### CHOOSE YOUR POISON

Imagine being able to choose which type of desktop [manager/software] to run like you can in Linux. Even if Microsoft wouldn't let just anyone create desktops, I'm sure that they could include this sort of function into Longhorn. Gates could make it a selling point — this desktop is suited to the home user, this one is great for developers, another one for the media centre and one for professional users.

God forbid if somebody can do a better or more efficient job than the current "Windows starts here".

**Michael Mallon**  
Brisbane, Qld

#### LAWS PROTECTING WHO?

With regards to the ACNielsen research referring to Australians accepting pirated goods (APC January, page 31), the law exists to protect the public. If the majority in a democratic society thumbs its nose at the law, it is high time for the law to be changed.

We are in a period of transition where technology is bringing all copyright into question. How much longer can a small group of publishers restrict the spread of information for their own financial benefit, in defiance of public demand?

**Alastair Munro**  
Canberra, ACT

#### RADIO MIX TAPES, 2004-STYLE

People with TV tuner cards can capture the audio [from music video programs such as] *Video Hits* or *Rage* and burn the music onto a CD. Of course you'd have to do some editing, but that would be an easy and free way to get music. Can record companies sue people for this kind of copying? By using this capture method, people could have the week's top 50 singles for free. What ingenious plan are record companies, ARIA and co. going to think of now ... encrypting the free-to-air signal?

**Timothy Nakhl**  
Brisbane, Qld

*Top marks for lateral thinking, but "easy and free" doesn't always mean legal, Timothy.*

#### BAD CREDIT

I was surprised to read Shay Hancox's letter (APC January, page 30). He used the example, "The next time you get pulled over for speeding, just tell the policeman that you didn't know the speed limit".

This is a very bad analogy. Telstra is basically giving its users unlimited credit (which I believe is illegal?) with little control on their internet account. That would be the equivalent to a policeman following your car around for an entire month and then pulling you over to say, you travelled 12km at 10km/h over the limit at 100 per km, so your fine is \$1,200, plus 10km at 15km/h over the limit at \$150 per km, so you have an additional fine of \$2,250, totalling \$3,450 for the month. Pay up!

In my many years in the computer industry, it amazes me how, the more a person thinks they are computer literate, how intolerant [they become], and how the concept escapes them that other people may not be.

Thankfully Telstra are offering an "unlimited" download cable account again, although reserving the right to slow the user

## Agenda:

your place to vent

OptusNet's spam statements do indeed amount to nothing more than PR spin (APC February, page 27). The company's online information is of no use to people with a spam problem, simply saying "buy some anti-spam software" and comments about applying rules in Outlook. The latter are generally useless due to the creative misspellings used by spammers.

Surely the cost of implementing some kind of spam-filtering would be more than offset by reductions in server capacity, bandwidth usage and user complaints?

I have an unusual spam problem. OptusNet users actually get six email addresses: the same user name but six different domains: [optusnet.com.au](mailto:optusnet.com.au), [optushome.com.au](mailto:optushome.com.au), [optus.net](mailto:optus.net), [mpx.com.au](mailto:mpx.com.au), [microplex.com.au](mailto:microplex.com.au) and finally [mailxxx.syd.optusnet.com.au](mailto:mailxxx.syd.optusnet.com.au).

In my case, the (username)@mpx.com.au address has been compromised, an address I didn't even know I had until the deluge of spam started arriving. Will OptusNet block this unwanted email address and deliver me from the evils of spam? No, they won't.

**Jolyon Hawley**  
Rydalmere, NSW

## Prize Pit

The lucky winner of our December 2003 \$10,000 cash giveaway is M. Heering of Balwyn North, Vic.



## Error Log

The telephone number on last month's CMV Polyview CT-723 monitor review (APC February, page 56) was incorrect. The correct number is (02) 9621 2999.

No space for a projector?



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# On Test

Detailed product reviews and comparisons

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## 54 Protac Excel G556

Protac is going after the high-end portable market with the new Excel G556.

## 54 Medion MD6100

Medion's MD6100 notebook is a solid offering in terms of power and features.

## 56 Panasonic PT-AE500

This wide-screen HDTV projector will open your eyes.

## 56 Netgear WGT624 and WG511T

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## 58 Nomad Jukebox Zen Xtra

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## 58 Pinnacle Steinberg myMP3PRO 5

Pinnacle's update to Steinberg's popular playing, ripping and burning software proves a winner.

## 60 Asour VPC-1000

Asour's VPC-1000 Multimedia Hub takes the fan noise out of your favourite CDs.

## 60 TDK Armour Plated DVD-R

Is there such a thing as a scratch-proof DVD?

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## Labs Challenges

### Barebones systems

2003 was the year that Small Form-Factor (SFF) barebones systems emerged as a serious contender in the PC market. *David Lin* tests nine new models.

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### Graphics Tablets

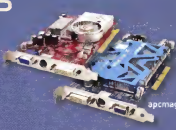
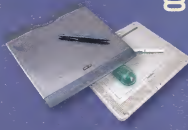
Graphics tablets are the way forward for your drawing needs. *Bill Bennett and Jon Harsem* sign off on five of the finest.

86

### Video Cards

Fast, good-looking graphics needn't cost the same as the rest of your PC's components combined. *Justin Kranz* looks at nine mid-range cards.

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► **Chips ahoy!** Intel will be pushing the new Pentium 4 processors throughout 2004.

# Codename Prescott

**Intel has finally unwrapped its latest offering in the Pentium 4 line. *Matthew Overington* has discovered it runs hot and, as yet, fails to impress.**

Intel launched the Pentium 4 SSE3 processor, previously known as Prescott, on 2 February, 2004. Prescott represents the first desktop processor from Intel to be built on the 90 nanometer process and is the second last call for the flagging Pentium 4 processor — the final swansong will come when Tejas is released in 2005.

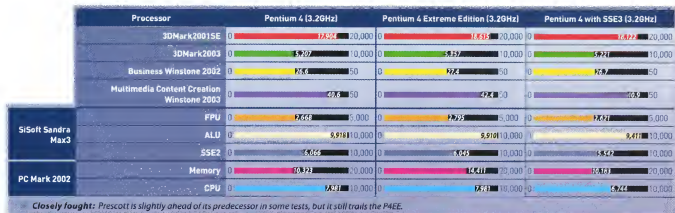
The chip was originally slated for release late in 2003, but processors rarely launch on time. Delays in moving production over to Intel's fledgling 90 nanometer process pushed the release date back until the end of February. APC received word in late January that the official release had been pushed forward again, so we built a Prescott-based system and set to work benchmarking it. We were particularly curious to see how the new chip stacked up against Intel's top-performing desktop processor, the Pentium 4 Extreme Edition. The new model differs from the P4EE in that it has less cache and a lower price tag.

Intel announced the Pentium 4 Extreme Edition at the Intel Developer Forum (IDF) in 2003. AMD had recently launched its Athlon 64 platform, proving to Intel that both 64- and 32-bit applications could coexist on one machine without a need for emulation. Intel had long claimed that such a feat was impossible using the x86 architecture.

AMD is enjoying strong sales with its Athlon 64-based line, a trend we expect to continue to gather momentum as the 64-bit version of Windows XP for Extended Systems reaches gold and hits the shelves.

## How we tested

All three processors were installed on an Intel D87SPBZ reference board for testing. They were mated to 512MB of PC3200 DDR SDRAM and a 120GB Seagate SATA hard disk. A Gigabyte ATI Radeon 9800PRO pushed the pixels, and the machine was running Windows XP (with Service Pack 1 installed).



The Pentium 4 SSE3 processor, built on Intel's Strained Silicon production process, initially generated more heat than its engineers had envisioned, so release was postponed pending a solution. There were also issues with current leakage across the transistor gates, which required voltage adjustments. (See "Coming to a desktop near you", on page 88 for information on the issues surrounding processor fabrication). The first-generation Prescotts draw up to 103W and are overheated, but Intel maintains this will be corrected in coming chips.

#### MORE THAN JUST A PENTIUM 4?

On paper, the new processors vary greatly from their predecessors. Aside from the obvious fabrication change, Intel has added a few new features and tweaked existing technology in an attempt to improve efficiency. The FSB is clocked at 800MHz and the processor launched at 2.8, 3.0, 3.2 and 3.4GHz. The move to a 90 nanometer process has enabled Intel to cram more components onto the same package and the new models are comprised of around 150 million transistors. The Level 1 and Level 2 caches have swollen to 16KB and 1MB respectively (from 8KB and 512KB in the previous iteration). The chip also includes 13 new instructions, previously uncreatively dubbed Prescott New Instructions (PNI), but later renamed to Streaming SIMD Extensions 3 (SSE3).

Other enhancements include a tweaked pre-fetch mechanism and allegedly more efficient HyperThreading support. The processor features a longer pipeline than Pentium 4's flagship 20-stage pipeline, so an improved pre-fetch system would substantially help performance. Of course, all the instructions in the pipeline still have to be thrown away in the case of poor prediction, but there have been no enhancements to branch prediction.

#### SSE3 (PNI BY ANY OTHER NAME)

Intel has traditionally looked at adding new instructions to extend the life of a given processor platform. Streaming SIMD Extensions (SSE) were first introduced to the Pentium III. They added eight 128-bit high-speed registers and a number of instructions to help speed data processing. SSE2 focused heavily on integer performance, and the 13 new instructions introduced in SSE3 will be of most use to 3D developers working with vectors or scalars. Two new HyperThreading instructions have also been introduced.

The only problem with a new instruction set is that developers have to optimise their code to reap the benefits. Support is also required at the OS level, but this could be a while off yet.

#### ON THE BENCH

First up, it's impossible to shed clear light on the performance of the chip as neither the new HyperThreading or SSE3 extensions are supported yet. The chip is outperformed by the current-generation Intel desktop offerings under Windows XP SP1, but this should change in coming months. Expect the performance to improve when an OS supporting the new features natively becomes available, and there's a mature application base.

The biggest reason that Prescott fares so poorly under our suite of single-thread benchmarks is the long pipeline and an inability to make use of the new processor extensions. The larger cache helps in memory performance, but still falls short of the mark set by current chips.

There's nothing revolutionary inside Prescott apart from the smaller manufacturing process, so these results don't provide much of a surprise. Expect APC to revisit the platform when we see more applications supporting HyperThreading and the SSE3 extensions.

#### SO WHAT?

The aforementioned heating issues should be addressed by the time the Pentium 4 SSE3 processor is moved over to the new Socket T packaging. The Socket T (775-pin) package will debut around the middle of the year, when the Grantsdale chipset is launched. Grantsdale will serve as the update to the i865 chipset and will support DDR 333/400 and DDR-2 400/533 RAM, the NewCard expansion card for Wireless, PCI Express, and serial ATA.

Although performance will improve as enhancements are made, we are still left wanting more. That said, it does perform slightly better than existing Pentium 4 models built on the Northwood B core. Given that the processors will be sold at the same rate as current models, anyone buying a new Pentium 4 processor in the first half of 2004 should opt for a Prescott model. Intel's President, Paul Otellini, said in November that the chip would make up 60% of sales by the second quarter of 2004 and has hinted that the processor will scale to 4GHz by the end of the year. However, performance junkies with Intel loyalties will still be better served with the Pentium 4 Extreme Edition, at least in the short term.

**Details**

Contact	Intel
Phone	(02) 9937 5800
Online	www.intel.com.au
Price	US\$278
	Competitive pricing.
	Performance not quite up to snuff.
Verdict	●●●●○

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# 64 odd bits of grunt

**The Athlon 64 has shown it can be competitive in the 32-bit realm, but does it have what it takes to make it in the 64-bit world?**

When APC first tested the Athlon 64 processor last year, we were disappointed by the performance of existing 32-bit applications running on beta versions of 64-bit Windows XP. In order to make the progression to 64-bit computing as painless as possible, current applications need to run, and run well, on the 64-bit platform while native applications are developed.

While many things work under the 64-bit operating system, performance is far from stellar, especially when the results are compared to what can be achieved from the same system running a 32-bit OS. However, these results can't be taken too seriously. After all, the final version isn't due until the end of the first quarter of 2004.

In January, we were informed that the final beta of Windows XP 64-bit for the Athlon 64 processor (based on Windows XP Professional) will only have very minor modifications made to it before it goes gold. We installed a copy so we could take a second look at AMD's Athlon 64 FX-51.

## 64-BIT AMNESIA

Much like the Opteron processor, the Athlon 64 has three modes of operation: native 64-bit, native 32-bit and compatibility mode. The latter is the key migratory feature of the processor, allowing for the execution of 32-bit code on a 64-bit OS running 64-bit drivers. This comes at a price: latencies are introduced when the CPU's integrated memory controller has to convert 32-bit memory addresses to operate under the 64-bit architecture.

Optimisations to system drivers have been made in this final beta of Microsoft's new OS in order to minimise the effect of these latencies, but there's only so much that can be done on the driver level — a large performance gap still exists when comparing the results to what can be obtained under an off-the-shelf copy of Windows XP.

Some applications (including the 3DMark2001 benchmark) refuse to run in this compatibility mode, reporting that the system doesn't have enough physical memory installed. Unfortunately, little can be done about this.

On the other hand, synthetic tests show advantages to this architecture — SiSoft's Sandra benchmark reports memory bandwidth in excess of 5,500MB/s, almost 11% faster than what's generally achieved on traditional PC3200-based systems.

## THE GAMER'S PROCESSOR?

But wait, there's more. NVIDIA has released beta versions of its ForceWare 52.16 drivers, allowing us to run our first tests of the Athlon 64 driving today's games under a 64-bit platform.



► **Urge overkill?** the FX-51 processor looks like a case of too much, too soon.

Once again, the news could be better. Only an average of 135.6fps can be achieved playing Quake III, and a mediocre score of 4,449 in 3DMark2003. The lacklustre performance can again be attributed to the 32-bit memory address conversion issue. This will really affect gamers, as they'll have to endure this added latency every time the frame buffer updates.

Some might be thinking "so much for the Athlon 64 being the gamer's processor". Frame rates at half what you can get from the 32-bit OS are disappointing, but serious fragners can work around this by dual-booting. Other users will have to put up with this compromise for the meantime, while waiting for native 64-bit editions of games. Titles such as Doom III and Half-Life 2 are just around the corner — we expect to report blistering frame rates and performance from these 64-bit games.

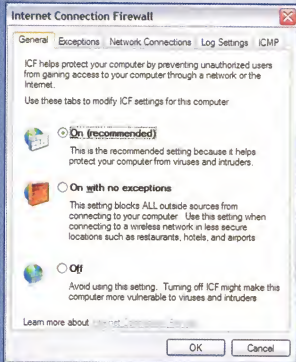
## TOO MUCH, TOO SOON

While AMD claims the 64-bit desktop is here to stay, many in the IT industry believe there's no real need for it yet. The fact that existing 32-bit applications still perform so much better on the current version of Windows XP means that power users will need to dual-boot between 32- and 64-bit operating systems to make the most of the powerchip inside their towers.

AMD has proved that running 32-bit applications on a 64-bit platform is possible, but performance needs to be sacrificed to make the transition to 64-bit computing smoother. The true test is how long 64-bit applications take to hit the shelves, and whether end-users will sacrifice performance for compatibility with their existing 32-bit applications during this delay.

**Jarrod Spiga**

Details	
Contact	AMD
Phone	(02) 8877 7222
Online	<a href="http://www.amd.com.sg/au">www.amd.com.sg/au</a>
Price	US\$733



► **Where there's smoke:** the Internet Connection Firewall (ICF) is now enabled by default.

Service Pack 2 also includes a substantial update to XP's Internet Connection Firewall (ICF), which debuted in the previous service pack. The new version works in much the same way as professional applications like Zone Alarm. Every app attempting to establish a connection over a network or Internet connection must be individually approved for access. Unfortunately, the current implementation is a bit raw, and the only buttons in the pop-up window are labelled **Configure** and **Close**. The **Configure** option spawns the ICF properties **Window**, where a program can be granted access via a checkbox under a tab. This isn't as elegant as a simple **Allow/Deny** option — we hope Microsoft addresses the issue before the final release.

Windows XP includes dangerous defaults that don't prevent the spread of worms. ICF is disabled straight out-of-the box, and Windows Messenger is configured to connect automatically upon boot. Thankfully, both of these issues have been addressed.

Worms can infect slow, networked computers with full startup folders before they even finish booting, as there's a small window between the initialisation of the TCP/IP stack and the time that ICF kicks in. This latency has been corrected in SP2. RPC (Remote Procedure Call) is designed not to function through the ICF. Worms such as MS Blaster used Microsoft's RPC to launch attacks, but RPC is now designed not to function through the ICF. It can be configured to work for services, but the user must manually enable it.

#### INTERNET AIDS

One of the most talked-up features of SP2 is the new pop-up blocker for Internet Explorer, which proved effective during the test period. That said, it doesn't do a better job than the free Google Toolbar and pop-up blocker plug-in for IE, but it should still benefit novice browsers.

Microsoft has finally realised that people download a lot of files from the Internet, and has added a download manager to IE. This is a small feature, but a substantial improvement over IE's previous implementation, which spawned a separate window for each transfer. It's not as good as some commercial download managers, though: IE supports automatic resumption of failed downloads, but can't segment transfers from FTP sites à la Getright. Outlook also receives a boost: it won't automatically open attachments, and suspicious files are quarantined until they're checked out. The wireless networking tool has been updated to make it easier to use, and there are added memory protection technologies like execution protection to safeguard against malicious code.

The Windows Update 5.0 service has been in testing since late 2003 and will be rolling out in the Service Pack via the improved engine. There are rumours that Microsoft won't be releasing the service pack as a standalone executable, but we'll have to wait and see.

As to whether or not SP2 will have a significant impact in the longer-term stability and public image of the platform, Redmond can only hope. You can check out the Windows XP Service Pack 2 documentation at [www.microsoft.com/downloads/details.aspx?FamilyID=7bd948d7-b791-40b6-8364-685b84158c78&DisplayLang=en](http://www.microsoft.com/downloads/details.aspx?FamilyID=7bd948d7-b791-40b6-8364-685b84158c78&DisplayLang=en) for a detailed list of changes to functionality. This is certainly a must-have upgrade for all XP users.

**Matthew Overington**

Details	
Phone	Microsoft
Contact	13 20 58
Online	<a href="http://www.microsoft.com.au">www.microsoft.com.au</a>

## Windows service

**Microsoft's Windows platform has had a hard time over the past year, but Service Pack 2 promises new features and security fixes.**

On 20 November, 2003, Microsoft requested beta testers for a version of the second Service Pack for Windows XP, even though it's not slated for release until the second half of 2004. This makes for one of the longest beta testing periods ever for a Microsoft Service Pack — proof positive that Redmond wants to get it right. We got a copy of the beta and ran it through its paces. Some features will undoubtedly change based on feedback from beta testers, but the core components won't.

#### SECURITY GUARDS

Microsoft has copped a lot of negative publicity over security flaws, and SP2 goes a long way towards addressing these concerns.

The first step is in making Windows Update a lot more prominent. Microsoft has frequently asserted that if Windows XP/2003 users had applied regular updates from Windows Update, the effect of the worms of August 2003 would have been greatly reduced. The first time a machine is rebooted after installing the service pack, the user encounters a full-screen window asking whether or not to enable Windows Updating. It's impossible to ignore, unlike the original system tray icon and it will ensure that users run regular updates.

As in Windows Server 2003, all ports are closed by default — you'll need to manually open a port if you want to use it.



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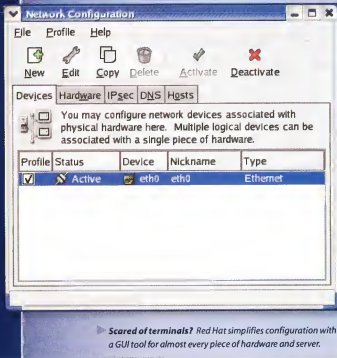
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## Enterprising position

**Red Hat is going after the corporate market and leaving its enthusiast roots behind with its new "Enterprise Linux" for workstations.**

Red Hat's announcement to cease maintenance and errata support for its Red Hat Linux line was met with dismay. With version 9.0 scheduled to reach the end of its life in April 2004, the company will now only provide a freely downloadable, but non-commercially supported distro in the form of the Fedora Project (<http://fedora.redhat.com>).

Many see the move as an attempt by Red Hat to shift its current paying customer base to the new support contract-based versions of its products, known as Red Hat Enterprise Linux (RHEL). The Workstation (WS) edition is built around the 2.4.21 kernel and XFree86 4.3.0 and is suited to desktop use in a corporate environment, as well as software development and clustered computing.

The default 2.2GB GNOME workstation profile successfully installs in around 45 minutes. Red Hat's KickStart feature (which allows administrators to clone a Red Hat install on another machine using an editable profile generated after each install) makes a welcome reappearance.

The default installation environment places heavy emphasis on productivity apps, shipping with OpenOffice 1.0, Evolution 1.4 email client and personal information manager, as well as GIMP 1.2 for image editing. Typical Internet applications such as Mozilla 1.4 and Gaim Instant Messenger 0.66 can also be found along with clients

for FTP, IRC and video-conferencing. There are no video or music library players, only XMMS (without MP3 support) and a CD player are included. Encompassing these tools by default is the GNOME 2.2 desktop environment, though an alternative, KDE 3.1, is also provided.

### DEVELOPING TOOLS

Application developers will find the GNU Development tool chain based around gcc-3.2 and the traditional Emacs21 and Vim editors. Development libraries and interface designers (Glade, Qt Designer) for GNOME and KDE are provided for developers of graphical apps. In light of GNOME being the default desktop environment, the omission of a GNOME-based integrated development environment such as Eclipse is perplexing, as Kdevelop is provided on the KDE installs.

Despite the name, RHEL-WS provides a few servers such as Apache 2 (with support for Perl, PHP and Python) for Web serving and development, Sendmail and Postfix for mail. The latest release of Samba provides interconnectivity with Windows network clients, while SQL users will be pleased to see the PostgreSQL and MySQL database servers. However, the workstation focus of this edition of Red Hat has led to the stripping of many common network servers from the distribution, such as those handling DNS, FTP and LDAP.

Some Linux enthusiasts may find the range of bundled software in RHEL-WS wanting, as Red Hat has shipped only one version of software for almost every given task, as opposed to providing a smorgasbord for users to experiment with and settle on something they like. For a corporate environment, this is understandable as a single way of completing a task greatly reduces the need for training of employees and support staff alike.

The plethora of configuration tools provided has taken on the nature of Windows-style control panels and wizards, allowing the user to bypass editing files and the terminal. Although, this simplicity has come at high cost of customisation.

Unfortunately, that the graphical package management tool has been simplified to the point that it is barely of any use to the seasoned system administrator. A cynic might suggest that Red Hat has deliberately omitted support for third-party RPM packages for fear of making it too easy for users to seek updates without a subscription to the Red Hat Network (RHN). The only saving grace is that the company now provides a Web console to remotely schedule package installs and upgrades from the RHN for all machines you have a subscription for.

For the seasoned Linux enthusiast, Red Hat Enterprise Linux Workstation may feel uninspiring and stifling, but for a corporate environment where productivity and a single source of updates is the first priority, RHEL-WS is worthy of consideration. A far greater factor to consider is that Red Hat promises a 12-18 month release cycle and five-year support.

**Andrew Lau**

Details	
Contact	Red Hat
Phone	1800 733 428
Online	<a href="http://www.redhat.com.au">www.redhat.com.au</a>
Price	\$564.50
✓	Simple, easy to use corporate distro.
✗	Power users will find it lacking.
Verdict	★★★★

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## Advantage Server

Hauppauge's new multimedia box acts as a media server beyond the living room.

PC's are becoming increasingly popular in living rooms, right next to DVD players and VCRs. Hauppauge has responded to the trend by developing a multimedia player that delivers PC-based video and music without keyboards and mice. It's a great idea, but the result isn't all smooth sailing.

The MediaMVP is a standalone unit designed to plug into the home (or business) network and play music, video and show pictures through your AV setup, with a PC running Windows 2000 or XP acting as a server. The MVP runs a Linux-based embedded system and specialised hardware which decodes the video and audio data from digital (the network) into an analog signal (for your TV). Supporting MPEG-1 and MPEG-2 video, MP3 audio and JPG, GIF and BMP picture files, the MVP comes with quite a pedigree.

Video output on the MVP box is via composite or S-Video, and audio via stereo RCA cables. The video playback of MPEG-1 and MPEG-2 files is almost flawless, jittering only slightly on a clip with a monstrously high (10Mbit/s) bit rate. This is more a factor of the network's inability to deliver a consistent stream to the unit than the MVP's functionality.

However, DivX support is another issue. DivX (MPEG-4), is not supported, and there's no mention on Hauppauge's Web site ([www.hauppauge.com](http://www.hauppauge.com)) of a future update being made available. This limitation means you're stuck to serving the unit with an MPEG-2 stream. At decent quality, this format equates to roughly a megabyte of data per second of movie viewing, or over 3GB per hour! Although disk space is cheap these days, this means that storing 50 hours of video, or roughly 25 to 30 movies, will easily consume a 160GB disk. In comparison, DivX-encoded movies take up between a quarter and a third of the amount.

MP3 playback through the unit is good — it only supports MP3, but understands playlists in M3U, B4S, PLS and ASX formats. Unfortunately, playlists can't be created on the unit itself, but must

reside and be created on the host PC in advance. However, the MVP can play whole directories, so you're not left high and dry if you haven't set up playlists. The audio quality of the unit is reasonable — everything sounds as it should, and it plays without a glitch. Sadly, only stereo sound is supported by the hardware.

Picture display is adequate, but lacks even simple manipulation functions, such as the ability to rotate or scale images. On the plus side, there's a slideshow function and everything is thumbnailed nicely in the menu. MP3s can be played at the same time. Last but not least, the box supports the playback of animated GIFs.

This unit is obviously designed to work with Hauppauge's range of MPEG-2 PVR and capture card products. The MediaMVP excels in this capacity as the playback device for your saved movies or TV. Cheaper than the most basic computers and without the nuisance of fan noise and keyboard/mouse control, the MVP is a great home entertainment device that could also be useful in schools or offices to serve video- or audio-based material.

**Nick Race**

Details	
Contact	New Magic Australia
Phone	(02) 9528 4555
Online	<a href="http://www.newmagic.com.au">www.newmagic.com.au</a>
Price	\$299
✓	Great playback quality, easy to update.
✗	Only stereo audio out, needs DivX support.
Verdict	●●●●○



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► **Pro tools:** Winamp 5's Media Library is the central database and search engine for audio and video files (top). With more than 100 visualisations and a graphic equaliser, Winamp 5 looks as good as it sounds (bottom).

and other applications don't seem to notice MP3s playing in the background. When playing the same track from a CD in mini-player mode, Winamp uses about 7MB of memory compared to 6MB with RealNetwork's RealOne Player or the whopping 29MB with Apple's iTunes. The minimum requirements for Winamp 5 are a 500MHz PC and 64MB of RAM, but you'll be safer with a 1.5GHz P4 or Athlon CPU and 256MB of RAM.

#### TUNE IN

One of the best new features of Winamp 5 is that in addition to Internet radio, you can now tune into thousands of free Internet TV stations. You'll need a broadband connection to do it justice, and you'll find plenty of funny, informative and downright bizarre video streams without too much searching.

To manage all local audio and video files, removable media and devices, Internet radio and TV stations, Winamp 5 Pro includes an extensive Media Library tool. It's basically a centralised database where you can go to search your collections by artist or album. You can also use the Most Played, Recently Added, Recently Played and Top Rated search functions to pinpoint files, and you can import directly from search results into playlists. The Media Library is also linked to the Web so you can find details about the song you're playing, artists, or the latest albums through the Now Playing page.

#### LOOKING GOOD

Winamp's visualisations are still the best in the business, thanks to its AVS (Audio Visual Studio) and Milkdrop engines. One hundred mesmerising effects are included and you can develop or download plug-ins for more effects and functions. Keep in mind, however, that Winamp 5 only supports plug-ins from version 2.

Skins and colour themes are also present, and both Modern and Classic skins from versions 2 and 3 can be used with version 5. If you feel like a new look, you can tap into the many user-created skins available from the Winamp Web site.

To tune up your tracks, the graphic equaliser function enables you to adjust your levels, including preamp and balance. There's also a cross-fade function for joining songs together and you can save and load equaliser presets.

As a piece of software, Winamp 5 Pro certainly delivers, and is a very comprehensive and well-designed media player. In isolation, it's an excellent package.

However, Windows Media Player 9, RealOne player and iTunes are serious contenders, and you can get the extra functions found in the Pro version elsewhere for free. For example, iTunes has unrestricted ripping, burning and MP3 encoding — at no extra charge. You could get all the features by running Winamp 5 standard and iTunes simultaneously. However, in buying the Pro version, you are supporting Winamp's longstanding and dedicated developer community, which is never a bad thing.

**Valens Quinn**

#### Details

Contact	Nulsoft
Online	www.winamp.com
Price	US\$14.95
✓	Excellent mix of features.
✗	Can get free unrestricted CD burning and ripping functions elsewhere.
Verdict	●●●●○

## New and improved

**Is Winamp's latest offering good enough to outshine the competition?**

Winamp began life back in 1999 as a humble shareware music player. After the release of version 2, Winamp became the de facto standard for playing MP3s on a PC. Version 3 had many new features but large resource overheads and instability problems let the program down. With Winamp 5, Nullsoft hopes to reclaim some of its glory days.

Winamp 5 is a combination of the stable and efficient code base of Winamp 2, the multimedia features of Winamp 3, plus some new functionality (2+3=5, get it?). The Pro variant has extra functions including unrestricted CD ripping, burning and MP3 encoding.

Winamp 5 Pro's unrestricted CD ripping feature is handy if you want to transfer your CD music collection to your hard disk. The Pro version rips at your CD or DVD drive's maximum speed, but the free version is limited to around a four-speed drive. The same goes for writing CDs — you can burn at a restricted speed with Winamp standard, or your drive's maximum with Winamp 5 Pro. Also, Pro can encode to MP3, WAV and the AAC audio format, in a wide range of bitrates.

Appearance-wise, the player applet looks more polished and there are a few new buttons, but the excellent interface is still recognisable from its version 2 roots. The stability and resource problems which plagued Winamp 3 appear to have vanished.

It takes about four seconds to load on a 1.4GHz Athlon PC,

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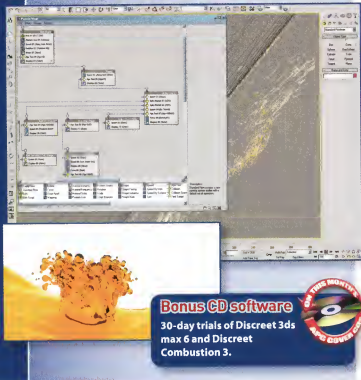
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## Studio to the max

**Discreet's 3ds max 6 adds enough new features to encourage old hands to upgrade while keeping its familiar look and feel.**

One of the most powerful modelling and rendering packages on the market, 3ds max is extensively used in professional video editing and movie making. In fact, you've probably seen the fruits of 3ds max in movies such as *The Core*.

In the past, Discreet has expanded the list of features between releases by adding new tools and functions, as well as including packages previously available only as separate products. Version 6 is no exception: it has a completely new particle system and the powerful Mental Ray.

### FX ANYONE?

Max users on subscription will already be familiar with Particle Flow. If you've only had exposure to the normal max particle systems, you're really in for a treat. Particle View reveals an easy-to-use interface, much like a flow chart, where each box (or event) contains a list of operators that are processed sequentially. Tests can also be inserted into an event, providing a method by which particles can branch into other events. By establishing events and linking them with tests, very complex particle systems can be built quickly and easily. The cache operator enables particle states to be saved at every nth frame — invaluable when creating complex effects.

► **Beware the blob:** the Blobmesh compound object adds much-needed functionality to Particle Flow. Particle Flow's event-driven interface allows the building of complex effects quickly and easily.

One new feature is the ability to use static or animated gradients and bitmaps to control parameters such as speed or emission area. This is indispensable when creating a water spray which only emits above the level of rising water, for example.

Missing from the Particle Flow feature list until now is metaparticles. Although not implemented within the system itself, metaparticles can be created through the use of a Compound Object, Blobmesh, which turns any particle or geometry vertex into a metaparticle.

### A PICTURE'S WORTH

Integrated seamlessly into the max interface, Mental Ray is accessed through the Render Scene panel. As well as having all the effects expected from a renderer of this calibre, such as caustics, depth of field, motion blur and global illumination, all standard max materials are fully supported.

A new Architectural material type is included, and is a great companion to AEC objects. With a simplified interface, they have been designed to allow the easy creation of high-quality, real-world materials. Other new rendering features include a Panorama exporter, combining six views into a single 360° image; the ability to region render a single frame; and command line rendering, which can override parameter settings and automate rendering tasks.

Architectural objects such as windows, doors and stairs can be created parametrically with UV mapping coordinates already assigned. Foliage, railings and walls can also be created from the AEC Extended rollout in the Create Geometry tab.

The patch modelling workflow has been overhauled with a more flexible cross-section as part of the Editable Spline modifier. Edit Patch automatically creates a surface and provides a handle sub-object mode. Also of note is the Patch Smooth utility, which can automatically remove pinching from selected tangents or the patch as a whole.

The new Mirror mode in the skin modifier halves rigging times for symmetrical or near-symmetrical characters, which can copy-and-paste bone envelopes and vertex weights from one half to the other.

Although extra constraints have been added to the new Reactor, Rag Doll is the one that stands apart. With systems like this used to eventually replace the stuntman, Rag Doll can simulate the behaviour of a lifeless human body under realistic physical conditions. It is also compatible with Bipod.

The new Shell modifier is similar to the freeware plug-in Solidify, and the Relax UV Coordinates tool helps resolves stretched mapping areas. The Schematic view has had a complete overhaul where hierarchies, materials, modifiers and controllers can be organised and wired. Using background images, schematic workspaces based on the visual layout of your scene can be created. The tutorials have also been completely reorganised into industry-related sections, so even the more experienced should take a glance.

So is it worth the upgrade? Use it for a week and you'll wonder how you coped without it.

**Bruce Creevey**

Details ▶▶▶	
Contact	Scholastic New Media
Phone	(02) 4329 9472
Online	<a href="http://www.scholastic.com.au/newmedia">www.scholastic.com.au/newmedia</a>
Price	\$6990.50; upgrades, 3ds max 5.x to 6 \$1,589.50; 3ds max 4.x to 6 \$2789.40; 3ds max 3.x to 6 \$2,590.50
✓	Particle Flow.
✗	Mental Ray rendering limited to two processors.
Verdict	●●●●○



## Power packed

**Protac is going after the high-end portable market with the new Excel G556.**

In the past, notebook buyers had to go with the big manufacturers if they wanted a powerful portable. But lately, manufacturers such as Taiwan's Elitegroup Computer Systems (ECS) are doing a better job of supplying enclosures to OEMs, allowing the little

guys to market heavy-duty laptops.

The mainboard ECS has built into the Excel G556 features an i855PM chipset and Intel's PRO/Wireless LAN 2100 LAN adaptor. The unit features a 1.7GHz Pentium M processor, giving a good balance of performance, features and power efficiency. The platform supports Intel's upcoming Dothan processors, allowing the brave to surgically replace the processor if desired.

A 53W battery supplies over three hours of juice — about what you'd expect from a Centrino system. Unfortunately, the low power alarm is annoying and there's no way to disable it. Weighing less than 3kg, the unit isn't too bulky and features a 15in TFT,

supporting a native resolution of 1,400 x 1,050.

The Excel offers remarkable gaming performance thanks to the integrated ATI Mobility Radeon 9600 M10P graphics chipset. A sizzling 9,557 3DMarks and a real-world average of 195.7fps in Quake III Arena — these figures are better than some mid-range desktops.

The 512MB of Kingmax PC2100 DDR SDRAM helps obtain scores of 38 from Winstone's Multimedia Content Creation benchmark and 29.6 from Business Winstone. The 60GB Fujitsu hard disk offers ample storage space; but if that's not enough you can use the DVD/CD-RW drive to back up data to disc.

Parallel, D-sub, TV-out, FireWire and two USB 2.0 ports and Type II PCMCIA slots are all present, while the audio subsystem supplies the standard headphone and microphone jacks. Fast Ethernet, infra-red and 56k modem ports supplement 802.11b connectivity, though Windows XP Home is shipped with the notebook. This prices it in the sub-\$3,000 bracket, but will prevent you from connecting it to many corporate domains. That said, Protac offers a range of upgrades to the standard configuration.

**Jarrod Spiga**

## Medion MD6100

## Minutes of fun

**Medion's notebook is a solid offering in terms of power and features. Enjoy it while it lasts.**

Following last month's review of Medion's killer desktop system (APC February, page 38), the German manufacturer's first notebook is now available only through Aldi supermarkets. The MD6100 is a desktop-style notebook, in many ways typical to dozens of models rolling off OEM notebook assembly lines in Taiwan and China, with a 2.6GHz Pentium 4 desktop CPU, SiS 648 chipset, 15in display and even a carry bag.

Clad in silver and blue ABS plastic, it has very little in the way of external adornment. A DVD-ROM/CD-RW combo drive is mounted at the front, while a single PC Card slot, infra-red and audio ports sit along the right. Ports on the back include parallel, serial, VGA, composite video out, FireWire, Ethernet, modem and three USB ports.

The built-in nVidia GeForce 4 488 Go graphics adaptor boosts video performance. As far as notebooks go, this is one of the quickest pixel pushers APC has seen.

With a 3DMark2001 Pro score of 6,992 and a Quake score of 199fps at a resolution of 1,024 x 768, the MD6100 will turn the heads of those who want a mobile machine with the least amount of compromise for gaming.

It plays DVDs with ease and the sound from the stereo speakers is adequate. For the serious stuff, there's 512MB of RAM, a 40GB hard drive and a generous software bundle: Windows XP Home, Microsoft Works Suite, Word 2002, Money 2003, Encarta 2003 Standard, Nero Burning ROM, MusicMatch Jukebox and Medion Power Cinema — a suite of CyberLink multimedia applications. Benchmarks show the MD6100 is up to scratch with a Business Winstone score of 25.6 and a MobileMark performance rating of 155, both of which are in the expected range.

However, this notebook can't last the distance. BatteryMark and MobileMark enacted battery runtimes in just 89 and 95 minutes respectively.

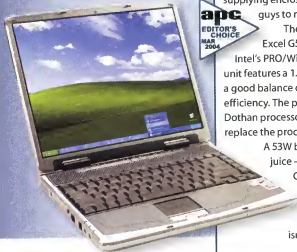
By all means have a look at the MD6100. It has the credentials in terms of computing power, but think twice if you're going to use it for extended periods away from a power point.

**David Lin**

### Details

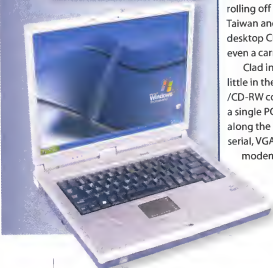
Contact	Protac
Phone	(02) 8748 8888
Online	www.protac.com.au
Price	\$2,999
✓	Top-notch performance, value.
✗	Battery alarm.
Verdict	●●●●●

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### Details

Contact	Medion
Phone	(02) 9460 4569
Online	www.medion.com/au
Price	\$2,200
✓	Powerful graphics.
✗	Low battery life.
Verdict	●●●○○







## survival of the fittest

The ASUS M6BN allows you to switch between internal CD drive, DVD drive, Combo drive, Floppy drive or a 2nd Hard drive. Plus with the built in Firewire support and USB 2.0 you can enhance connectivity turning your notebook into a multimedia hub.

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## Screen of your dreams

Panasonic has upped the home theatre ante with its wide-screen, HDTV projector.

After a slow start, digital television is finally gaining significant momentum in Australia. HDTV cards are becoming more prevalent for PCs, and Panasonic has even launched a HDTV-compatible projector, aimed at the high-end home user.

On paper, the unit is impressive: it boasts a 1300:1 contrast ratio, an 850 ANSI lumens lamp and an HDTV 1,280 x 720 pixel LCD panel. It features a range of connection options, including

VGA, DVI, Scart, RGB, S-Video and composite sockets. Like the majority of projectors, the PT-AE500 ships with a lamp rated at 2,000 hours (or up to 5,000 hours in economy mode).

When the unit reaches 2,000 hours under normal operation, it's automatically shut down to prevent potential damage.

The fan noise is rated at 27dB, an acceptable level for a home cinema

projector, and the internal speaker is easily loud enough to overcome it.

This unit includes a number of clever features to enhance the screen image. The HDTV LCD panel provides a clearer image than DLP projectors — and that's before the Smooth Screen technology is applied to the resultant image. Smooth Screen is designed to blur the edges of pixels, so individual squares can't be detected on the screen.

The PT-AE500 features an AI setting which automatically adjusts the brightness and contrast based on the image sent to the projector to provide consistent viewing. Manual fine-tuning controls for RGB and contrast/brightness are also present, and while the fine adjustment is slow, the results are worthwhile. The unit also includes vertical/horizontal keystone correction so it can be offset from the screen surface and still produce a rectangular image.

The screen image is clear and bright, even though a lamp rating of 850 ANSI lumens isn't exceptionally high for a modern projector. Users looking for a really bright display should choose a unit rated at 1000+ ANSI lumens.

**Matthew Overington**



## Details

Contact	Panasonic
Phone	13 26 00
Online	www.panasonic.com.au
Price	\$3,899
✓	Clear image; Smooth Screen works well.
✗	Lamp brightness could be higher.
Verdict	●●●●○

## Netgear WGT624 and WG511T

## The need for speed

Netgear has a novel approach to improving 802.11g's disappointing transfer rate.

One of the biggest tech let-downs of last year was the lacklustre performance of first-gen 802.11g wireless gear. Although the spec claims hardware is capable of reaching 54Mbit/s, real world transfer rates hover around 25Mbit/s.

Netgear has a clever approach to increasing the bandwidth with its 108 Wireless PC Firewall Router. The unit uses two 802.11g channels at once to up the theoretical maximum bandwidth to 108Mbit/s. The innovation is in the access point's Web-based configuration panel. This is an obvious way to increase available bandwidth, but it also prevents any product not featuring Netgear's "108" logo from connecting to your network at full speed.

Thankfully the Netgear unit can run in standard 802.11g or 802.11b modes. The big question is whether actual performance is increased by a factor of two over competing 802.11g products.

In our tests, performance slightly increased and data transfer rates were more consistent. In line-of-sight applications, the peak transfer rate measures a mere 32Mbit/s — an increase of 28%, while average throughput increases by 44%. For non-line-of-sight applications peak transfer rate increases by 2%, but average throughput boosts by an impressive 85%.

The firewall features stateful packet inspection and can block access to sites via keyword and domain name. By specifying an excepted IP address, sites can be re-evaluated at other user's request without reconfiguration. Layer 4 Service filtering is also present via IP or port blocking, and schedules can be applied to specify when rules should take effect.

A DHCP server is also bundled, and options to set the scope of addresses available for allocation and address reservation options are easily configured.

The PC card is simple to install and use, though users who don't have an optical drive will need to find an alternate way to install the device drivers. Two LEDs on the top of the card show when data is being uploaded or downloaded.

If you can manage to keep a native Netgear network, you will gain some performance increase.

**Jarrod Spiga**

## Details

Contact	Netgear
Phone	1800 502 061
Online	www.netgear.com.au
Price	108Mbit/s Wireless PC Firewall Router WGT624, \$299; 108Mbit/s Wireless PC Card WG511T, \$179
✓	Average throughput increase; firewall features.
✗	Burst throughput increase; 108Mbit/s is proprietary.
Verdict	●●●●○





## perfection runs with the best



The ASUS L5 notebook represents the flagship of the ASUS range and there are perfect reasons why it is the best. Put simply, if you want it you got it.

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## Details

Contact	Creative Labs
Phone	(02) 9021 9800
Online	http://australia.creative.com
Price	\$899
✓	Large storage capacity; USB 2.0 support.
✗	Dated design; bulky compared to some other players.
Verdict	●●●○

## Size matters

**Creative's latest portable audio player features plenty of storage, but lags when it comes to style.**

"Functional" is the word that comes to mind when examining Creative's new 60GB Zen Xtra. The cigarette box-sized unit weighs a relatively heavy 226g, and bulks out to approximately 30mm deep in its supplied travel casing.

All control buttons on the Zen Xtra — track and menu navigation, power and volume — are located on the sides of the unit. Having no controls on the front of the player makes the unit look cleaner, but it's counter-intuitive in operation. The menu tree could also stand some pruning. The top edge features power and headphone input, as well as a USB 2.0 port. The supplied earbuds are decent quality, but don't include their own controls.

An LCD occupies roughly a third of the front panel, and beneath the anodised aluminium faceplate is a 3.6V Li-ion battery, which averages over 13 hours of operation. The build quality of the release

mechanism is commendable: its plate springs off promptly when the bottom-edge button is pushed, and snaps back reassuringly when reattached.

The device appears in Windows Explorer (there's no support for other platforms). Dragging audio files into the Nomad doesn't make them playable unless they're put into certain directories, as the device is also able to function as a portable storage unit.

Playback remains smooth and uninterrupted, even when the unit experienced a sharp jostle, although brief delays and hard drive vibrations are evident when skipping across tracks. The inclusion of EAX technology makes for a brief diversion, but in a portable player, audio effects are more a gimmick than an essential function.

While the iPod draws interface inspiration from mobile phones, the Zen series takes its cues from personal cassette players. Moving to 60GB and USB 2.0 are an indication that Creative is willing to stay up-to-date, but given that the new iPod range has traded storage volume for a business-card sized format, eating into Apple's market share will most likely require a return to the drawing board.

**Justin Kranz**



## Pinnacle Steinberg myMP3PRO 5

## Details

Contact	Lako Pacific
Phone	1800 657 601
Online	www.lakopacific.com
Price	\$99
✓	Simple, easy-to-use jukebox software.
✗	Massive memory footprint.
Verdict	●●●○

## Hitting the heights

**Pinnacle's update to Steinberg's popular playing, ripping and burning software proves a winner.**

Pinnacle acquired Steinberg last year and has refreshed the latter's flagship audio player for 2004.

MyMP3PRO is designed to serve as the main management environment for a music collection: songs can be copied, deleted, renamed and edited directly within the main interface.

Fortunately, the software features the ability to transfer songs directly to a portable music player such as the MusicMatch Jukebox or Windows Media Player. It can even be used to copy audio files directly to a memory key. Given the proliferation of current-generation portable music players with massive hard disks and the ability to store entire collections, this is a must-have feature on all serious audio software.

Previous versions often crash during operation, but version 5 remains stable, working with a database of over 8,000 MP3s. The player's 50MB memory footprint is

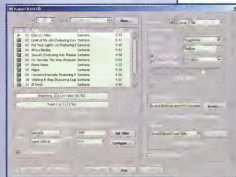
acceptable on a modern system with at least half a gigabyte of RAM, but excessive on an older machine.

MyMP3PRO includes an advanced EQ, along with a CD/DVD-burning engine, FTP functionality and skinnable interface. It handles all common audio formats, but can't play video. While the interface is compelling, there are few features found in the \$99 app not available in Apple's free iTunes package.

One handy feature is the ability to normalise the volume of a collection of MP3s before burning them to CD to ensure that each track is recorded at the same volume. A range of DJ effects are also included, along with a beats per minute counter and cross-fader so you can mix your own continuous albums. The application also supports for VST plug-ins.

MyMP3PRO features a number of handy, well-integrated utilities, including a label editor. Previous versions included time-limited MP3 ripping support. Many users were outraged when they discovered that the commercial version of the software was limited to 20 MP3 rips before they had to pay for an MP3Pro update. Unfortunately, this hasn't been rectified.

**Matthew Overington**



# priced to mesmerise

The ASUS A25H is a notebook that will mesmerise you. Firstly it is packed with a full list of practical features at a great price. But that's not all. Whether you are in a business conference or relaxing at a café, the A25H is your reliable and robust companion.

For connectivity, imagine the support of 5 USB 2.0 ports enabling you to hook up multiple peripherals easier and faster.



## ASUS A25H

### A25H266CM

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Privation Computers 02 9313 8811  
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Cyclone Computer 07 3881 2520  
Hunts Computers 07 4639 6000  
FTC - Brisbane 07 3358 8468  
(Head Office)

**ACT**  
Famstar 02 6257 1808

**WA**  
Austin Computers 08 9201 2768  
Computer CyberShop 08 9227 6580  
PLE Computers 08 9309 4771

**ASUS**  
HEART OF TECHNOLOGY  
WWW.ASUS.COM.AU



## Details

Contact	Upgrade Yourself Computers
Phone	[02] 9982 9939
Online	www.uyc.com.au
Price	\$349
	Excellent functionality.
	Limited to 128Kbit/s MP3 playback
Verdict	●●●●○

## Let's get rocked

**Asour's VPC-1000 Multimedia Hub takes the fan noise out of your favourite CDs.**

The VPC-1000 Multimedia Hub is a surprisingly good mix of standalone stereo, DVD-ROM and audio processor designed for the lounge room PC crowd.

Functioning as a standard DVD drive when the PC is turned on and a stereo while the PC is off, a flip-down fascia hides the DVD-ROM tray with a four-colour VFD (vacuum fluorescent display). The comprehensive remote controls CD/MP3 playback, sound processing adjustment and track processing.

At the rear of the unit you'll find 3.5mm connectors for audio in/out, a socket for the supplied 12V power pack and a connector for a thin wire radio aerial (supplied). The VPC Hub is installed in a 5.25in drive bay, connected to the PC's IDE bus. A ribbon cable and standard Molex connector power the unit, but as the current flows from the 12V adaptor, the drive can run with the computer switched off. The output from the existing sound card passes

through the PCB, and the system's speakers (PC or home stereo) are plugged directly into the PCB. The front faceplate extends around 2cm from the front of the PC — so one good knock could turn the Multimedia Hub into an expensive DVD-ROM.

Playback of standard audio CDs is clear. MP3 playback on CD is supported, but only files encoded up to 128Kbit/s. FM radio playback is acceptable, although a bigger aerial would produce better reception.

In its favour is the VPC-1000's built-in audio processing by SRS Labs, including the WOW technology and TruBass enhancements. With five presets plus user-controlled settings for music "width" and "punch", the VPC acts as a respectable sound processor. WOW and TruBass give depth to the 128Kbit/s MP3 file limitation, and as all sound output from the PC is routed through the VPC, the SRS processing is applied to all sound and music.

The VPC-1000 Multimedia Hub is well-designed, without any major drawbacks. The 128Kbit/s limit for MP3s is our only complaint, but the WOW and TruBass technologies compensate sufficiently.

**Nick Race**



## Details

Contact	TDK
Phone	1300 305 835
Online	www.tdk.com.au
Price	\$9.95
	Resilient against normal damage; UV protected.
	Only DVD-R format at present.
Verdict	●●●●○

## Armour all

**Is there such a thing as a scratch-proof DVD? TDK comes close.**

Growing concern about the long-term stability of information burnt onto CD has flowed on to DVD media. TDK's claims that its Armour Plated technology makes DVDs 100 times more scratch resistant are therefore likely to be of interest to people whose media comes in for robust treatment.

The new version of the media, dubbed Phase 2, can record at 4x speed and offers UV protection. At \$9.95 each, the discs are competitively priced, but still lag behind hard drives in the price per gigabyte stakes.

APC compared the Armour Plated Phase 2s against standard media. With Nero's DVD utilities we tested the speed and access for both with no markings, light scratching, and ultimately heavy scouring with a metal scouring pad handily supplied by the company — as well as testing playback on a number of large media files.

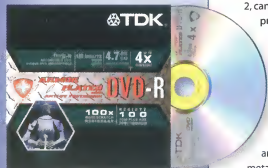
After light scratching, the speeds of both types of DVDs remain roughly identical. When playing in a range of cheaper DVD players however, the standard media frequently has difficulties accessing the DVD, or can't read it at all.

Heavy scouring quickly removes the reflective surface of a standard DVD, rendering it unreadable in the DVD-R unit, let alone other readers. Applying the same pressure to the Armour Plated DVD, little further damage is done. The surface is quite resilient to punishment, so it was only by grinding the pad into the surface could we really leave an impression. Even then we weren't able to remove the lacquered coating. And the DVD played back flawlessly on all drives used.

Obviously it's still possible to render the DVD useless (grabbing a screwdriver and scoring a few gouges and dents is sufficient) but this DVD-R proves it can take incidental scratches in its stride.

TDK is promising to release DVD-RW, DVD+R, and DVD+RW versions later this year, but for now DVD-R is the only offering. Beyond more than a mere gimmick, if your usual DVD-R media costs the same or more, you have no reason not to try these out.

**Justin Kranz**



# Home Networking Starts Here!



## WiFi-b™ WLAN Card

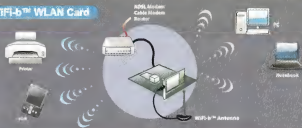
- 11 Mbps 802.11b Wireless LAN
- Wireless Internet Access Sharing
- Hassle-Free Home Network
- Free Software AP (under WinXP only)
- Easy Setup Wizard

## Home Networking Starts Here!

ASUS Wi-Fi@HOME™, as the name suggests, is the latest platform specifically designed to simplify the process of building a wireless home network. In short, the goal of ASUS Wi-Fi@HOME™ is to enable reliable wireless data transfer through the 802.11b standard, easy Internet access sharing, and simple setup at an affordable price.

This new platform includes three elements: ASUS motherboards with the Wi-Fi slot, the Wi-Fi-b™ add-on card and ASUS Software AP (under WinXP only).

## WiFi-b™ WLAN Card



## A7V600

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- VIA KT600/8237 Chipset
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- Gigabit LAN (AI NET)
- 2 x SATA with RAID 0,1
- 6-channel audio with S/PDIF digital out
- 8 x USB 2.0



## Model List with Wi-Fi slot

P4C800 Deluxe, P4C800, P4C800-E, P4P800 Deluxe, P4C800-E, P4P800, P4P8X, P4P800S-E, P4P800S, P4S800, P4S800D, P4V800D, A7V600, K8V.

Visit [www.asus.com](http://www.asus.com) for an updated list.



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**SYNNEX**

Synnex Australia  
Tel: 1300 880 038  
[www.synnex.com.au](http://www.synnex.com.au)

**ASUS**  
HEART OF TECHNOLOGY

## Details

Contact	Lako Pacific
Phone	1800 657 601
Online	www.lakopacific.com
Price	\$99
	Easy to use.
	Simplistic; can't create sub-menus.
Verdict	●●●○

## Just add action

**Pinnacle has produced a simple, no-frills package for burning home videos to disc.**

As the name implies, Pinnacle's Instant Video Album is a straightforward application for producing CD or DVD albums.

The first step is to import your video—either directly from a digital camcorder using FireWire, or an analogue source using an S-Video or composite connector. You can also use video stored on your hard drive.

All the standard formats are supported, including AVI, DV, MPEG-1 and MPEG-2. Still photos can also be imported to make slideshows or title screens. The preview screen allows you to view your footage or seek the point to begin importing.

A number of pre-set menu styles are available with a variety of text, frame and backgrounds (both still and animated). Alternatively, you have the option to

create your own original menus. Sadly, sub-menus aren't supported.

The video editing dialog enables finetuning in several areas. For example, you can customise chapter or scene starting points, split or delete scenes and enhance the clips. Unfortunately, this requires some PC grunt. Performance was clumsy and jerky at best when testing on a 600MHz Pentium III system. However, we had no problems with the program on our 1.2GHz Athlon setup.

An interesting feature is the automatic filmmaker, which enables you to select clips and a soundtrack and let the software generate a video for you. The scene changes are matched to the beat of the music, and the results are surprisingly impressive.

Once an edited video is completed, the software can be used to output to DVD, VideoCD and/or SVCD. A label-maker is also included to round out the package.

Pinnacle Instant Video Album is ideal for home users: it's simple, user friendly and effective.

However, hardcore keyboard jockeys will be left wanting more flexibility.

**James Eke**

## ScanSoft PDF Converter

## PDFs made easy

**Need to edit PDFs but can't justify \$950 for software? ScanSoft almost has the solution.**

The PDF file format is one of the world's most popular for sending information, thanks mainly to the security elements built into the file spec. Although many applications can now create PDF documents, they can't be edited directly without expensive tools like Adobe Acrobat 6.0 Professional (\$949).

ScanSoft has released a single-click solution that converts PDFs into fully laid-out, editable documents in the world's most used piece of software—Microsoft Word. And while there are several products that claim to extract text from PDFs, it's relatively uncommon to find one that recreates the graphics too.

PDF Converter adds the ability to open PDF files from within Word's Open file dialogue. It also inserts an Open in Word option for PDF files in

Windows Explorer, and an extra right-click option for PDF links in a Web browser. If you receive a

PDF attachment through Microsoft Outlook (not Express), a handy button sets the conversion in motion with one click. Add the ability to convert documents in foreign languages to English, and it all sounds great for less than \$100.

Unfortunately, functionality is limited. The software won't convert locked PDF files, and big, complicated documents produced using page layout programs aren't handled well (in most cases they produce no result apart from a text extraction error message). It also has a tendency to ignore tab characters, and anything graphical done with the text in a PDF comes out as a jumble—scientists looking to convert documents laden with mathematical equations are better off looking elsewhere. But when dealing with relatively plain, straightforward documents, PDF Converter works a treat. It puts pictures in the right place and ably recreates text and paragraph formatting.

If you work in a field where you access a lot of legal, academic or corporate documents with a minimum of design flourish, it's well worth the price tag. Just don't expect it to work miracles on complicated documents.

**Drew Turney**

## Details

Contact	Scholastic New Media
Phone	(02) 4329 9472
Online	www.scholastic.com.au/newmedia
Price	\$99
	Fast; easy, fairly reliable.
	Limited functionality.
Verdict	●●●○

**ScanSoft**  
**PDF Converter**  
**for Microsoft Word**

Product ID: PC-0139010-08222003

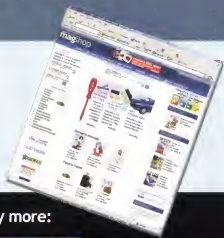
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# **Ulead DVD Workshop 2 packages**



## **Features include:**

- ▶ A powerful, intuitive authoring software for producing professional DVDs.
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- ▶ Enables you to create dynamic navigation menus and multiple subtitle and AC-3 audio tracks.



## Bad to the 'bones

Arguably the biggest buzz in PCs to come out of 2003 was the emergence of small form factor (SFF) barebones systems. Itty-bitty desktop PCs have been around for years, but it took Taiwan's Shuttle to put SFF on the map as a serious platform. *David Lin* tests nine new models.

A significant factor in the allure of SFF barebones PCs is that you can make them into whatever you want. One vendor's research estimates that 60% of its SFF models do service at LAN parties. Others lead more sedentary lives as servers or network-attached storage (NAS) devices; meanwhile, other users still are pressing their SFF barebones PCs into service as media centres in the lounge room.

Up to this point, however, Taiwanese manufacturer Shuttle has led the way in the creation of cutting-edge barebones systems. These contain quality products made of excellent materials, and feature innovative cooling, power supply and industrial design techniques. They've spawned a host of copycat designs, but they've also raised the bar for others to forge further advances.

On account of their varying roles and configurations, traditional APC means for evaluating desktop PCs must adapt to the purpose of assessing this new breed of machine. Many SFF barebones will attract prosumers — second- or third-generation owners with a specific use in mind who are even willing to build the thing themselves.

Of course, the SFF barebones we address here are still full-powered PCs accommodating the latest CPUs and core logic. Thus, if you're looking to build a screamer of a machine, the SFF system will provide the building blocks to do it. Each PC allows limited expansion — an AGP slot, dual channel memory and serial ATA (SATA) support are offered on some; others even support aggressive overclocking.

For many SFF users, however, pure performance may take a back seat to "the package" on offer. These customers may pay more attention to details such as whether the vendor has included a remote control, the number and type of front-mounted ports, and so on.

Often, the positioning of cable ties and power connectors will also determine whether the DIY experience is to be celebrated or lamented. All of these mini-PCs come with shortened cables appropriate for traversing the smaller distances inside the case, and their ribbon cables are invariably rounded to improve the prospect of unimpeded airflow.

The noise level of the machine is also an important consideration, as some enterprising types see SFF barebones as building blocks for personal video recorders (PVRs). With the convergence of PC and consumer electronics technologies, one of the issues facing stakeholders migrating PC technology in such a role in the lounge room is just how much machine noise will prove acceptable.

Within this consideration is also the number and type of video outputs the PC offers. No-one is going to be impressed with your home theatre if you're only able to show them a Hollywood blockbuster on a 17in monitor. So, think of alternatives, such as an S-Video output for display on projectors or TVs. As for audio, it's rare to find any system in APC Labs these days which doesn't support 5.1-channel sound. The

quality might be debatable, but you'll get by with any of the out-of-the-box solutions covered here.

Our previous Labs Challenge foray into SFF barebones threw up both slimline desktop-style and shoe box or cube-style machines. This time around, the challengers are all of the shoe box variety, accommodating both AMD and Intel platforms.

You might still see dealer catalogues featuring a number of slimline barebones at prices that blow you away, but our advice is, check again. Several vendors submitted PCs of this style; however they use the older 845G chipset and won't accommodate the 2.6GHz Pentium 4 Northwood C CPU featured in our tests.

That's not to say these SFF barebones are to be ignored. Older-generation models occupy minimum desk space and can turn into simple office workhorses for a minimal cost. The older, slower technology also often makes little difference to users who find themselves only running normal office productivity applications.

Whether your SFF system is taking the role of the second PC in the house, the office workhorse, or the new media centre hub in the lounge, you'll see plenty more of these shoe box PCs this year as they take on the traditional desktops, notebooks and set-top recorders.

### How we tested

Each SFF barebones system was built from what the vendor supplied. We used a 2.6GHz Pentium 4 Northwood C-class CPU for the Intel platform. (Some contenders couldn't accommodate the chip running at its full capability). AMD platform systems used an Athlon XP 2800+ CPU. Direct performance comparisons between the Intel and AMD platforms in this instance are difficult as there is too much divergence between them.

Each system was fitted with 512MB of PC3200 DDR SDRAM. Those with serial ATA support were fitted with a 120GB Seagate Barracuda

SATA drive; if SATA wasn't available, a 120GB Western Digital Caviar 1200JB drive was used. A DVD-RW drive was fitted as the optical drive (if required). Except for one vendor's entry, all of the candidates had onboard graphics adaptors.

Benchmark testing included Business Winstone 2002, Multimedia Content Creation Winstone 2003, SYSmark 2002, 3DMark 2001 Pro, 3DMark 2003 and Quake III Arena.

Apart from the formal benchmark tests, we paid attention to the build quality, ease of access to internal and external appointments, noise, features and aesthetics.



## AOpen XC cube EZ65

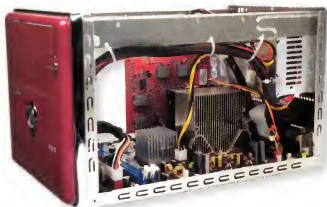


It was a difficult decision to make, but we awarded the coveted Editor's Choice to AOpen's Intel entrant, the XC cube EZ65.

Its race against the Shuttle Zen proved a tight one, but in the end the question boiled down to subjective, personal choice. Rather than consider the features, performance or value for money offered, our question was simply, which machine would we most like to work with?

Much of the hype surrounding each of these PCs cancelled the other out, but the EZ65's stunning appearance and strong features made it the box we couldn't wait to get our hands inside. The same went for the XC cube EZ18 as our top-rated AMD-platform SFF barebones PC.

Whipping off the cover of the XC cube reveals a Springdale chipset motherboard, the AOpen UX45G-1394. The drive cage accommodates a single 5.25in drive and an external 3.5in drive. The 3.5in hard disk sitting in a cradle under the cage can be left in place or removed



► **Take it away:** the XC cube EZ65's interior view with drive cage removed.

to gain access to the memory, SATA and IDE drive connectors and CPU subsystem.

The hard disk cradle's clever design allows it to be pulled out and the drive fitted before it's slid back in and secured. There's sufficient clearance below the cradle to allow fingers in to change DIMMs.

However, anyone wanting to fit a floppy drive will have to snake the cable over or around the CPU — not ideal, perhaps, but at least it's possible for those who must have one.

AOpen supplies a heavy copper-base heatsink fan cooler, with the fan mounted to blow sideways across the expansion slots. There are no case fans, which appears to make the EZ cube a candidate for overheating, but at no stage did it prove unstable or stressed, and no exhaust was overly warm.

In the performance stakes, the XC cube EZ65 manages a less-than-stellar 29.5 in Business Winstone and an ordinary 632 in 3DMark2001 Pro. It's not a top performer, but as with all these SFF barebones, it could just be a matter of fitting an AGP card and you're in business.



► **Room to move:** this AOpen has ample space around its PCI and AGP slots.

### Details

Contact	Bluechip Infotech
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	\$415
✓	A delightful to work with.
✗	Slow performance.
Verdict	●●●●●

## ABIT DiGiDiCe

The DiGiDiCe looks more like a mini microwave oven than an SFF PC, but there's a reason for it. Basically, its shape allows for more storage devices. Hidden behind a recessing door, there's room for two 5.25in external drives (for optical or tape drives) and two 3.5in internal drives. Offering two 5.25in bays is a rarity among SFF PCs — in this line-up, only Solte's QBIC can match it.

There's room to spare when you open up the case. One side holds the drive cage for the opticals and a multibay flash reader, while another smaller cage holds the hard drives. Both are secured to the sturdy steel chassis by screws and must be removed to gain access to the CPU and memory. Any work on the lower part of the system means removing eight screws and de-mounting the drives.

Assembling the DiGiDiCe's CPU subsystem is an involved procedure. Its heatsink is oversized and connected by heat pipes to the back of the unit, where a small fan is attached to the outside of the chassis. The Outside Thermal Exhaust System (OTES), appears to be highly efficient in drawing heat from the heatsink's fins — its dissipation works so well that ABit includes a hot oil burner attachment (which clips onto the fins) plus a phial of essential oil.

The most unusual aspect of the DiGiDiCe is the prominent dial on its front. Whilst running as a PC the dial acts as a volume knob. When the machine is turned off, the dial



allows you to crank the system up through five turbo settings — like a foolproof overlocking utility. Each increment gives a few extra frames per second in Quake III. The LCD shows the time when idle, and system temperature and fan speeds when running. The remote control turns the machine into a media centre and the four buttons below the LCD are for functions such as launching the DVD player or copying a CD.

The DiGiDiCe is based on an 865G chipset motherboard and will accommodate any Socket 478 processor. Even with the easy overlocking dial, performance is modest. ABit appears to be promoting it as a gaming platform, but for that to happen, a performance video card is needed to boost the paltry 50fps in Quake generated by the onboard graphics adaptor at 1,024 x 768 resolution.

Details	
Contact	Altech Computers
Phone	1021 9735 5655
Online	www.altech.com.au
Price	\$440
✓	Easy overlocking.
✗	Storage needs to be completely removed to access the motherboard.
Verdict	●●●●○

## AOpen XC cube E418

AOpen has been in the barebones business for a long time, offering slimline-style machines such as the H340 model (reviewed APC June 2003, page 66), but its XC cube line is a new approach.

The EZ18 is the AOpen AMD platform barebones system. It's clad in white and, like its Intel platform XC cube, is a model for ease of assembly and maintenance. Layout of the front panel is plain: two drive bays and front ports are masked behind hatches, and although measuring 5.25in, its lower drive bay is only capable of holding a 3.5in device such as a floppy drive. Fitting a floppy could prove awkward as the connector for the controller is easily missed, tucked away under the power supply behind the heatsink fan.

After removing the three thumbscrews for entry, the drive cage can also be removed to fit the CPU and cooler, although there is so much room that you can actually access memory and the CPU with the cage in place. Much like the Shuttle XPC ST62K, the hard drive sits in an east-west direction under the cage, and can be removed. AOpen provides the heatsink and fan for the CPU. It has a heavy, oversized copper base with a quiet but powerful fan — the only one apart from that serving the power supply in the system.

It's the small things that make working with this SFF system a delight. Anyone who's had to wield fat fingers inside a small enclosure will appreciate the clearance you get inside the XC cube.

Molex power connectors are conveniently tied close to where they are needed. Ribbon cables are bound and cut short

so that coiled loops of extra cable don't impede and interrupt airflow.

The EZ18 is also strong in the video area. The nVidia nForce2 chipset on the motherboard supports multiple video outputs, and AOpen has taken the opportunity to include dual VGA ports and an S-Video output, making it ideal for presentations.

Benchmark results reveal the EZ18 as a competent performer. Its Business Winstone score of 30.9 is a par figure in a group where speedy graphics isn't a strong suit. The 4,702 extracted from 3DMark2001 Pro won't let you play the latest action entertainment titles, but pixel-pushing power can always be improved by adding a third-party AGP card.



Details	
Contact	Bluechip Infotech
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	\$385
✓	The best and easiest AMD SFF PC to work with.
✗	No floppy controller.
Verdict	●●●●○

## Jetway MINIQ 760S

From the outside, the system looks like any typical barebones box. Its silver aluminium cover is held in place by thumbscrews, while an acrylic cutout covers the front panel. The power and reset switches are located underneath the unconventional rocker housing its hard disk drive and power LEDs.

Protruding from the back of the case are PS/2 mouse and keyboard ports, along with two USB 2.0, two serial, parallel and FastEthernet network ports.

Making up the audio ports are optical-out, line-in, line-out and microphone jacks. A D-sub plug is present for connection to a monitor, while a bracket featuring a second D-sub and TV-out ports is also included.

Present on the front of the box are another two USB ports, two six-pin FireWire ports and headphone, microphone and optical-in jacks. Underneath the case, two rubber and two plastic feet are attached. The front-mounted plastic feet are taller than the rear rubber ones, angling the case slightly upward. If you don't like this look, another pair of rubber feet identical to the rear ones is supplied.

The designs of the heatsink and fan on this unit are dubious. The separate units must be screwed to each other during assembly, but unfortunately the oversized screws supplied made this task near-impossible. We broke a screwdriver tip getting the screws in, only so far as to fit the fan loosely to the heatsink. This was enough to do the job, but if you

need to move the PC about, consider investing in better screws.

As with most SFF cases, installing and removing hardware from the inside is serious business. CPU and RAM installation require the removal of the 200W power supply — not an easy task due to the number of cable ties used, as well as the routing of power cables.

Performance-wise, 4,360 in 3DMark2001 Pro is a reasonable score from the integrated GeForce 4 MX GPU and is enough to display 106.1fps under Quake III Arena. However, for better performance, gamers should utilise the AGP slot on the NF18GF motherboard.

Scores of 313 for Internet Content Creation and 173 for Office Productivity under the SYSmark2002 benchmark indicate that this unit would perform well as a workstation.



### Details

Contact	OTC Computer
Phone	(03) 9545 3966
Online	www.itwarehouse.com.au
Price	\$380
✓	Solid performance
✗	Bad HSF design; silver sticker quality
Verdict	●●●○

## Convergence trends

For years, people have envisaged that computers will eventually become ubiquitous. In 2000, Cisco's iHome was fitted out with \$250,000 worth of AV, home automation and other computer gear. Internet refrigerators have also been created and (much to the amusement of many) since as far back as 1990, PCs connected to the Internet have been used to control toasters and coffee pots.

Similarly, the barebones system is the result of the convergence between the home entertainment system and the multimedia PC. Back in 1999, an APC writer built a micro-ATX-based Celeron 300A into a humble cardboard box, stored it on top of his VCR and connected it to an 80cm TV. People who saw the unit were amazed, if somewhat bemused.

Today, the functionality of power towers has been miniaturised into pocket rockets, albeit at the expense of expandability and upgradability. MSI has added an AM/FM radio tuner to its MEGA PC, while remote controls are bundled with the more complete kits. Bundle a DVD-ROM with a board capable of surround sound into a brightly illuminated case, and you have a home entertainment rig with a similar look to some hi-fi setups.



► **HTCCPCP**: in every convergence lies the potential for a new acronym.

Future convergence trends will see most builders amalgamate new innovations for the PC into their products. For example, the popularity of Wi-Fi means set-top video streaming boxes are now available. Some SFF vendors are also integrating Wi-Fi into the motherboards inside their enclosures.

In the next couple of months, digital TV tuner cards can be used instead of digital TV set-top boxes. Next year, Blu-ray drives will allow you to burn digital TV streams directly to removable media, making VCRs obsolete.

A new range of stunning enclosures are adding spice to the mix. For this roundup, Acer supplied a candy apple red unit. US vendor Out of the Box has created the Think Tank: "the world's first computer to fuse top-of-the-line technology with a customised black motorcycle tank dressed in classic hotrod flames."

Developments on the Internet will also bring about change.

The emergence of greater QoS controls in IPv6 and the growth of broadband may see the home telephone replaced by a barebones-based voice and video over IP solution. And maybe in the not too distant future, the Hyper Text Coffee Pot Control Protocol (HTCCPCP) will have a more common use...



## MSI MEGA 180

The MEGA 180 is an SFF barebones system similar to the MSI MEGA 651 reviewed in APC back in September 2003 (page 46). It is targeted at those interested in a media PC and is styled to fit into the lounge room.

Some of the deficiencies experienced in the 651 — most notably, in its graphical capabilities are addressed in the 180, with the biggest difference being that the 180 is an AMD platform system using a motherboard based on the nVidia nForce2 chipset.

The 180's exterior is a smart black and gunmetal colour with the front divided into a number of panels. Its top panel is a dust cover for the DVD-ROM/CD-RW combo drive; below this is the LCD panel, which has multiple functions like a clock or graphic equaliser readout, depending on which function is current. The next panel is a six-in-one card reader and the lowest panel is a dust cover for the front-mounted ports. MSI Australia advises us that it's standard, but it can be removed and replaced with a floppy drive if required. Floppy support is available in the BIOS, although both the floppy and card reader can be dispensed with, and a second hard disk mounted in the bay.

Access to the interior is wholly dependent on whether the drive bays are occupied. The combo drive dominates the front upper half of the machine and must be removed before any work can be accomplished. Memory can be accessed from the left side, but the CPU subsystem is a little more finicky. MSI supplies a heavy-duty heatsink fan (actually, two fans) which is screwed, not clipped, to the retention mechanism. The airflow from the CPU blows east-west across the PC and is vented through holes on



Details ▶▶	
Contact	MSI Australia
Phone	(02) 9748 0070
Online	www.msicompuser.com.au
Price	\$550
✓	Radio tuner and hi-fi remote control.
✗	Cramped interior.
Verdict	●●●●○

## Shuttle XPC SB75G2

Okay, this is the only machine in the line-up without its own onboard graphics adaptor, running on the Canterwood chipset.

As it's the only system using Intel's premium desktop chipset and lacking onboard graphics, it's the only one we've tested using a third-party AGP graphics card. Anyone paying attention to the benchmark scores should keep this in mind. At \$639, it's also one of the most expensive SFF systems around.

There are no dust covers or hatches on the SB75G2's front panel, just the essentials such as power and reset buttons, LEDs for power on and disk activity, and the front-mounted ports. The rear is also no-nonsense and includes two serial ports.

Under the hood this Shuttle is all XPC-class. The drive cage is similar to the Soltek and AOpen PCs and needs to be removed before access can be gained to the IDE connectors and memory.

However, the available clearance means you could probably work in these locations without having to remove the cage. The height of the cage is not as great as some, as there is only one 5.25in and two 3.5in bays. Similarly, the Shuttle-branded ICE cooling system and CPU can also be manoeuvred with the cage in place. There is some cable clutter, but not as much as in the Zen model.

As with all the Shuttle XPCs, system noise is negligible. There is the single case fan as part of the ICE cooling system. The power supply fan and the Northbridge 875 chip also have an active cooler, but hardly a peep could be

heard, even when it was running full tilt.

For performance junkies, the jewel in the SB75G2 is its system BIOS, which has some overclocker-friendly features. The FSB is adjustable, as is the AGP, PCI and SATA clock. Others may offer these BIOS settings but it's another thing to make them work well.

For consistency, and to keep benchmark scores down (especially in graphical tests), we fitted an MSI FX5200 AGP card. It still blows the opposition away in 3DMark2001 Pro with a score of 7,495, and is the only SFF system to complete the exacting 3DMark2003 test with a score of 1,198. In 2D tests the MSI card makes little difference, as evidenced by the average Business Winstone score of 30.3.

Even though it's the best, most appropriately-featured of the SFF PCs to fit in the lounge room, this is still first and foremost a PC with the "work in progress" sign hanging over its media centre pretensions.



Details ▶▶	
Contact	Global Business Technology
Phone	(02) 8718 8888
Online	www.gbt.com.au
Price	\$639
✓	Fastest SFF barebones PC on the block.
✗	Expensive; no video.
Verdict	●●●●○

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## Shuttle XPC Zen ST62K

The Editor's Choice award may have gone to the AOpen, but with little argument really could have swung in favour of this machine.

The Zen is based on a tiny motherboard using the ATI Radeon 9100 chipset. It's the smallest in the XPC range and the smallest in this line-up. Shuttle rates its capacity at 20% lower than the internal measurements of the other XPCs. This is both a good and bad thing, but in the end it works against the Zen.

The comfort factor when constructing a machine is high on the list of tests we have, but the ST62K's smaller internal dimensions are immediately obvious when the case is opened. Where the AOpen EZ65 is outstanding, the Zen isn't so kind to fat fingers. However, the Zen isn't a nightmare to build — it's just that the EZ65 is so much easier.

Another aspect unique to the Zen is that it's the only machine to come with an external power supply. An SFF PC is always challenged by heat dissipation and with the Zen's dimensions, it's even more important that the job's done right. Taking the PSU out of the box has two advantages: lowering internal temperatures and reducing noise levels. Of course, the downside is there's something else to lose if you plan to move it around. And if the PSU fails, you're stuck until you can get a replacement, as no generic PSU will do.

This is the smallest and lightest SFF PC, and also the quietest. Like the other Shuttle XPC, the Zen incorporates ICE Technology cooling with the modest cooler atop the CPU, and the heat pipes drawing the heat to the heatsink and

outward-blowing fan. On account of its external PSU, this is the only fan in the box. During testing the only noise audible from about a metre away was the clicking of the hard disk — with the cover off.

With the lowest Business Winstone score of only 27.4, the ST62K isn't a stellar performer, but it does better in 3DMark2001 Pro with a score of 4,773. It also features some odd errors of omission like dual FireWire ports on the back panel, but none in front.

If silent operation and a small size appeal to you, and you're not deterred by occasionally requiring the dexterity of a surgeon, then the Zen is the system for you. It's a class act and its suitability for most purposes (especially in a discreet home theatre setup) is assured.



Details ▶▶	
Contact	Global Business Technology
Phone	(02) 8718 8888
Online	www.gbt.com.au
Price	TBA
✓	Smallest and lightest.
✗	Superbly engineered, but still tight to work in.
Verdict	●●●●○

## Soltek QBIC EQ3401A

Outwardly, the only difference between this Intel platform SFF barebones PC and its sibling, the AMD platform QBIC EQ3702M, lies in its rear panel ports and slight difference in the colour of its side panel.

We're more impressed with the EQ3401A than the EQ3702M. For a start, the problems we had with the Athlon machine, such as system failure from overheating, didn't occur with this machine. Opening the cover reveals the same drive cage arrangement as the EQ3702M — one of the few to offer two 5.25in external drive bays. This needs to be removed before attacking the motherboard, the Soltek SL-B8E-F, which is based on the 865 (Springdale) chipset. The drive cage fit is awkward, and any internal work is best accomplished with the front panel detached from the chassis so the cage can align itself properly.

The CPU retention mechanism is of standard Intel issue and, unlike the EQ3702M, no dedicated CPU cooler is provided in the box. The standard cooler we used did the trick and there's sufficient clearance inside the chassis for us to manoeuvre without twisting cables around.

Remarkably, the EQ3401A's noise level (or lack thereof) rivals that of the Shuttle Zen. With the cover in place, it's also as close to silent from a metre away as the Zen. It achieves this through both its 250W internal power supply (with fan) and its Soltek-branded IcyQ cooling system, which includes smart BIOS support for variable revs from the fans and a case fan venting to the rear, as

with the EQ3702M. Unlike the EQ3702M, however, rebooting the machine doesn't herald a scream from the fan.

The EQ3401A proves a competitive performer on the Lab bench, rating 29.9 in Business Winstone — around par for all the Intel platform barebones PCs — and a poor 2,870 in 3DMark2001 Pro.

Its \$432 price tag is reasonable and includes a carry bag and the best third-party software bundle on offer in this Labs Challenge, making it an interesting candidate overall.

With the provision for dual optical drives and its whisper-quiet operation it would make an unobtrusive DIY video recorder.

Alternatively, jazz it up with a performance video card, drop it into the carry bag and take it to a LAN party.



Details ▶▶	
Contact	Altech Computers
Phone	(02) 9735 5655
Online	www.altech.com.au
Price	\$432
✓	Dual optical drive bays.
✗	Drive cage awkward fit.
Verdict	●●●●○

## Soltek QBIC EQ3702M

Based on Soltek's SL-B7A-F — an nForce2-chipset board — the QBIC EQ3702M is the company's AMD platform SFF PC. It bears only a slight similarity to the QBIC 3000M, which won the Editor's Choice in the Labs Challenge of June 2003 (page 64).

Anyone with a bit of experience working inside a PC will appreciate that components need to be constructed or fitted in a sequence, and in the case of the EQ3702M, all we had to do was remove the three thumbscrews for the cover and another two for the drive cage, pull the cage out and the entire interior was at our command.

Its memory and the IDE connectors sit directly below the cage, and easy access to the CPU made clipping the heavy copper heatsink fan provided by Soltek a snap. Indeed, the QBIC EQ3702M proved one of the easier SFF systems to get into and manipulate.

Although cooling from the heatsink fan is adequate, we found that this PC runs hot.

A case fan — part of Soltek's celebrated IceQ cooling technology — is also mounted to the side, drawing air from within and expelling to the rear. During operation, these fans wail like banshees but cranks down the revs after a few seconds.

A warm draught can always be felt blowing at the back, and during installation of Windows XP, the system kept rebooting of its own accord.

Altech advised us to reseat the CPU and reapply thermal grease. This fixed the problem, but after completing the

benchmarking tests, the system failed again on the following day with the same ailment.

Other than this idiosyncrasy, the QBIC EQ3702M behaves well — 27.9 in Business Winstone is down on a par score for this test, but 4,583 in 3DMark2001 Pro is around the score expected.

The EQ3702M's feature set is satisfactory, and includes both dual VGA and an S-Video output. To have three FireWire ports mounted both front and back is unusual, but could prove handy. Soltek's software bundle is probably the most useful of the offerings

In this line-up, though the AOpen XC cube

EZ18 is without doubt our pick of the AMD platform SFF barebones systems.

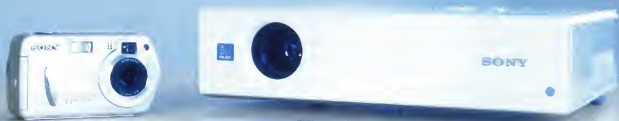


### Details

Contact	Altech Computers
Phone	(02) 9735 5655
Online	www.altech.com.au
Price	\$470
	Easy installation.
	Noisy fan burn!
Verdict	●●●●○

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Manufacturer	ABIT	AOpen	AOpen	Jetway
Model	DrGDiCe	XC cube EZ65	XC cube EZ18	MiniQ 7665
Contact	Altech Computers	Bluechip Infotech	Bluechip Infotech	OTC Computer
Phone	(02) 9713 5655	1800 803 802	1800 803 802	(03) 9545 3986
Online	www.altech.com.au	www.bluechipit.com.au	www.bluechipit.com.au	www.itwarehouse.com.au
Price	\$440	\$415	\$385	\$380
Chipset	Intel 865G	Intel 865G	nVidia nForce2 GT	nVidia nForce2
FSB (MHz)	400/533/800	400/533/800	200/266/333	200/266/333
DIMM Slots	2	2	2	2
PCI Slots	1	1	1	1
AGP Slot	1	1	1	1
External 5.25in bays	2	1	1	1
External 3.5in bays	N/A	1	1	2
Internal 5.25in bays	N/A	N/A	N/A	1
Internal 3.5in bays	2	1	1	2
IDE Connectors	2	2	2	2
SATA Connectors	2	2	N/A	N/A
Audio CODEC	Realtek	Realtek ALC650	nVidia MCP-T	nVidia MCP-T
Speaker Support	5.1	5.1	5.1	5.1
Audio Jacks	Mic, Stereo, headphone, line-in, S/PDIF out	Centre/sub, line-out, mic, SPDIF in, SPDIF-out	Centre/sub, line-out, mic, S/PDIF out	Headphone, 1 x line-out, 1 x line-in, mic, S/PDIF in, S/PDIF out
Onboard Video	Intel Extreme Graphics 2	Intel Extreme Graphics 2	nVidia nForce2 GT	nVidia nForce2
Video Outputs	VGA	VGA	Dual VGA, S-Video	VGA
Ethernet	10/100	10/100/1000	10/100	10/100
Front-Mounted Ports (except audio)	2 x USB, 1 x FireWire, 6-in-1 card reader	2 x USB, 2 x FireWire	2 x USB, 2 x FireWire	3 x USB, 2 x FireWire
Rear-Mounted Ports (except audio)	PS/2, 2 x USB	PS/2, 2 x USB, 1 x FireWire, parallel	2 x USB, 1 x FireWire	PS/2, 2 x USB, 2 x serial, parallel
Remote Control	Yes	No	No	No
Wireless	No	No	No	No
Power Supply Rating (W)	700	220	200	200
Number of Internal Power Connectors	3 x Molex, 1 x FD, 2 x SATA	3 x Molex, 1 x FD	3 x Molex, 1 x FD	3 x Molex, 1 x FD
Case Fans	2	N/A	N/A	1
Cables and Connectors	1x Floppy, 1x IDE, 2 x SATA	2x IDE, 1 x FD, 1 x SATA, 1 x SATA power	2 x IDE, 1 x FD, 2 x SATA, 1 x SATA power	2 x IDE, 1 x FD
Software	InterVideo WinDVD & WinFlip	N/A	N/A	N/A
Additional	Volume/overclocking dial, LCD display, hotkeys, backpack, essential oil kit	N/A	N/A	Carry bag



MSI	Shuttle	Shuttle	Soltek	Soltek
MEGA 180	XPC S875G2	XPC Zen ST62X	QBIC EQ3401A	QBIC EQ3702M
MSI Australia	Global Business Technology	Global Business Technology	Altech Computers	Altech Computers
(02) 9748 0070	(02) 8718 8888	(02) 8718 8888	(02) 9733 5655	(02) 9733 5655
www.msi.computer.com.au	www.gbt.com.au	www.gbt.com.au	www.altech.com.au	www.altech.com.au
\$550	\$639	TBA	\$432	\$470
nVidia nForce2	Intel 875 P+ICHR-5	ATI RS300 + 58200	Intel 865G	nVidia Crush18G
200/266/333	533/800	400/300/800	400/533/800	266/333
2	2	2	2	2
1	1	1	1	1
1	1	1	1	1
1	1	1	2	2
0	1	1	1	1
1	N/A	N/A	N/A	N/A
1	1	2	1	1
2	2	2	2	2
N/A	2	N/A	2	N/A
Realtek ALC650	Realtek ALC650	Realtek ALC650	Realtek	nVidia MCP2-T
5.1	5.1	5.1	5.1	5.1
S/PDIF-in, S/PDIF-out, mic, line-out, line-in, mic, headphone	S/PDIF-in, S/PDIF-out, centre/sub, line-out, line-in, mic, headphone	S/PDIF-in, S/PDIF-out, centre/sub, line-out, line-in, mic, headphone	Mic, headphone, line-in, S/PDIF-out	Mic, line in/out, headphones, S/PDIF-out
nVidia nForce2	N/A	ATI Radeon 9100IGP	Intel Extreme Graphics 2	nVidia GeForce4 MX
Dual VGA, S-Video	VGA	VGA, S-Video	VGA	Dual VGA, S-Video
10/100	10/100/1000	10/100	10/100	10/100
2 x USB, 2 x FireWire	2 x USB, 1 x FireWire	2 x USB	2 x USB, 1 x FireWire	2 x USB, 1 x FireWire
PS/2, 2 x USB, parallel	4 x USB, 1 x FireWire, PS/2, RJ45, serial	2 x USB, PS/2, 2 x FireWire, serial, S-Video	PS/2, 2 x USB, 2 x FireWire, RJ45, serial	PS/2, 2 x USB, RJ45
Yes	Optional	No	No	No
Optional	Optional	Optional	No	No
250	250	180	250	200
3 x Molex, 1 x FD	2 x Molex	3 x Molex	4 x Molex, 1 x FD	4 x Molex, 1 x FD
0	1	1	1	1
2 x IDE, radio antenna	1 x FD, 2 x IDE	2 x IDE, TV-out	1 x FD, 1 x IDE	1 x FD, 1 x IDE
Nero Burning ROM, Cyberlink Power2Go	Mandrakesoft Linux 9.2 Discovery Edition, MDU (manual, drivers, utilities)	N/A	PC Cillin 2002, Virtual Drive, Restore IT! Lite, Partition Magic 6 SE, Drive Image 4	PC Cillin 2002, Virtual Drive, Restore IT! Lite, Partition Magic 6 SE, Drive Image 4
DVD-R/DL/CD-RW combo drive, 6-in-1 card reader	N/A	N/A	Carry bag	Carry bag, copper heatsink fan



## THIS YEAR IT EVER

Subaru's Impreza WRX has just been named "Best Sports Car under \$57,000\*\*" at Australia's Best Cars Awards. But then winning comes quite naturally to the Impreza WRX having dominated national and international rallying for years. Such are the testing grounds in which Subaru has chosen to develop its All-Wheel Drive System, Symmetrical Drivetrain and Boxer engine. It's this



\*Joint winner of Australia's Best Cars Best Sports Car under \$57,000.



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# Visual basics

Fast, good looking graphics don't have to cost as much as the rest of your PC's components combined.

Justin Kranzl looks at nine mid-range cards.

Gone are the days when top graphics performance required spending the better part of \$1,000. True, cutting edge video hardware remains well over \$800, but there's no shortage of cheaper cards which stand up equally well to the demands of current applications.

One of the chief concerns of people shopping for a new graphics card is whether their investment is future-proof. For the purpose of this Labs Challenge's hardware, if your target machine has less than a 2GHz CPU, it's likely the system architecture will be a much larger bottleneck than any of these cards, so rectify that before taking the plunge.

If your CPU is faster than 2GHz, these cards should perform well on the type of applications coming in 2004. Half Life 2 and Doom 3, two games featuring entirely new graphics engines, will be the new benchmark for 3D graphics: both games' graphics engines have already been licensed to other game developers, meaning that if a system can run one of these games, the odds are other new games will also run adequately.

The hoary old cliché about the buyer being the winner is true in this case. No longer does buying a graphics card at half the price of the fastest on the market mean compromising on the level of experience you can expect. On average, the submitted cards' image quality, level of construction, even bundled software, all seem to be on a par with their more expensive cousins.

## How we tested

A clean installation of Windows XP with Service Pack 1 was installed on a Pentium 4.3GHz (Northwood) machine. A 120GB Serial ATA drive complemented two 256MB sticks of PC3200 RAM. Cards were first tested in 3DMark2001 (Second Edition, version 330) with DirectX 8.1 installed — 3DMark2001 second edition doesn't operate properly under DirectX 9.0. DirectX 9.0b was installed for the remaining tests. 3DMark2003 was patched to version 340 prior to testing.

ATI cards were tested using Catalyst 3.10 drivers, released 17 December, 2003.

NVIDIA cards used ForceWare drivers (version 53.03, released 9 December, 2003). Vertical sync was turned off to prevent certain apps capping the frames per second in testing. Aside from 3DMark2001, Aquamark, Quake III Arena, and Unreal Tournament were used in tests. Quake III Arena and Unreal Tournament testing were both conducted at 1,024 x 768 resolution at 32-bit colour. Quake III Arena had all its visual options maximised, including trilinear filtering and the `r_picmip` variable set to 0, the highest visual quality setting.



## Powercolor Radeon 9600XT Bravo

Powercolor's tag line on a piece of its bundled software reads "the best game card in the world" — an epithet we'll attribute to the carpet bombing school of promotional sloganeering. After all, there's a world of early adopters buying graphics hardware more than double the value of this one (Powercolor's Radeon 9800 Pro model, to name just one).

But we're judging Powercolor's finesse with hardware, not marketing. And by any measure, it excels here. The Radeon



9600XT Bravo ranks in the upper half of benchmarks at all times — no mean feat considering two clearly superior-powered cards are in the fray. It even cheekily steals ahead of both of the GeForce

FX5900XTs in the Quake III benchmark, scoring a first place tied with the HIS EXcalibur at 245.3fps. It further added insult to injury by beating the MSI FX5900XT in Aquamark.

The build quality of the card is middle-of-the-road. It's sparsely populated, and "demure" is the best way to describe the petite, ornate fan and heatsink sitting atop the bright red PCB. It does a reasonable job of cooling though, given the stability of the unit in testing.

Very welcome at this price point is Video In Video Out (VIVO) capability — something most cards don't feature. Instead of a small VIVO box, Powercolor opts to supply an assortment of cables that do roughly the same thing, while being messier, as well as having the added bonus of being easy to misplace. Less easy to lose is the included compact DVI-I to VGA adaptor. Plenty of games are bundled as well — the latest Tomb Raider title, Big Mutha Truckers and ATI's standard compilation games disc comprising of offerings such as Warcraft III and Splinter Cell. InterVideo's WinDVD and Cyberlink's PowerDirector movie-creation software are also provided.

The Powercolor is a very sharp performer in this range. It's not the fastest card on test here, but is competitive across the board. At this price range the decision is as much about value for money as speed. The addition of a comprehensive software bundle and the inclusion of video in/out make this a worthy Editor's Choice.

### Details

Contact	Australia IT
Phone	(03) 9543 5855
Online	www.australait.com.au
Price	\$286
✓	Video in/out; competitive performance.
✗	Not the fastest card tested.
Verdict	●●●●●



## Albatron GeForce FX5700 Ultra

The Albatron card is the most unattractive card we've seen in the APC Labs. The GeForce FX5700 Ultra, or "Frankenstein's Monster in silicon", features a blue-greenish PCB laden with silver and purple capacitors, topped by a large metallic blue heatsink covering three (yes, three) fans. It's just the kind of thing the case modding crowd go crazy about. Install this into a machine featuring a cold cathode bold enough to push illumination near it, and it's a recipe for instant ugly.

But there's method in this madness. Aesthetics aside, the three-fan arrangement is an Albatron trademark — the Wise Fan II. Two fans are operational at all times: if one peters out, the third starts. Given that they're all spaced at equal distances from the GPU (a heatsink sits on top, not a fan) the extra fan should function as well as the regulars.

Being a GeForce FX card, you might expect the card to be a tank, but the build quality of the cooling solution on this card is exceptional. It's weighty, but it looks like it can withstand a fair bit of punishment. The only normal-looking part of this card is the back panel, which features the standard DVI-I, VGA and TV-out ports.

The metal cooling sinks under the anodised blue plate cover a great deal of the board's surface area, which is important given the lack of a GPU-mounted fan. The noise given off by the fans is negligible, and the sturdiness of the overall unit bodes well for potential overclockers.

This is just as well, because once the card was put on the test bench, punishment is what it copped. The Albatron skated perilously close to last place in testing amongst other GeForce FX5700 Ultras — which as a group were only beaten into last place by the ASUS GeForce FX5600. The best result for the card was a creditable third place in 3DMark2003.

Given the reasonable price, this lacklustre performance could be forgiven if there were a lot of extras. Sadly, there aren't. WinDVD creator, Duke Nukem: Manhattan Project, and an ageing games compilation is your lot. VIVO is an optional extra. Judging from the absence of a multi-port adaptor in the packaging, for this price it's not included. Neither is a DVI-I to VGA adaptor or a power cable. There are better-value cards to be found in this test.

Details	▶▶
Contact	Australia IT
Phone	(03) 9543 5855
Online	www.australiatit.com.au
Price	\$297
	Built to last.
✓	
✗	Mediocre performer, stingy bundle.
Verdict	●●●○



## AOpen Aeolus FX5700 Ultra

AOpen is better known for its cases and motherboards than its video cards, but the cookie-cutter nature of nVidia and ATI's chipsets make it easy for a decent-sized manufacturer to get involved in the game. AOpen seems keen to have a go, and this effort shows the company is rapidly coming to grips with the performance aspect.

This is a solidly-made card, as one would expect from a manufacturer of AOpen's pedigree. It looks very similar to a reference card — green PCB and a black, nVidia-branded heatsink/fan combination. On the underside, a broad sink covers the RAM area, with a strip sink running diagonally beneath the GPU's position topside. Like other cards, the standard back plate, featuring DVI-I, TV and VGA-out has a small lip on the leading edge, lending a little more stability to the panel than past cards have offered.

Compared to other GeForce FX5700 Ultras tested, the Aeolus proved it could stand the heat of competition. Its shortcomings in 3DMark2003 and Aquamark are offset by leading performances in Quake 3 and 3DMark2001. But this isn't a test of nVidia cards only, and it's in competition against higher-powered nVidia cards and the Radeons that the Aeolus falters.

The bad news continues when looking at the bundled software. The review box APC received included WinDVD and... nothing else except a driver disc — disappointing if you've just laid out a few hundred dollars on video hardware. Hardware extras are also minimal — a TV-out cable, DVI-I to VGA adaptor, and that's it. There's not even a spare power lead for the card — a standard feature for other GeForce cards tested. Given the generic appearance of the Aeolus, the lack of extra material supports the notion that AOpen has merely gone through the motions in producing this card — it's great for those who simply want a solid card, not so great for those who want extra value for money.

While the Aeolus boasts a quality build and acceptable performance, it doesn't excel in any area. This card is proof that AOpen can hang with its GeForce competitors in terms of performance, but there are more powerful cards reviewed here which provide far better value.

Details	▶▶
Contact	Bluechip Infotech
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	\$TBA
✓	Sound construction.
✗	Only one piece of bundled software.
Verdict	●●●○





## ASUS GeForce 5600

ASUS's GeForce FX 5600 is hopelessly outmatched by the other competitors in this test — it manages to come last in every single bench test.

The GeForce 5600 is destined more for a life in budget bins than among the throng of high-performance mid-range cards. Its primary targets are those who want acceptable performance from the games of today, not tomorrow. The key word here is "acceptable". This card — even when coupled with a super-fast CPU and a stack of RAM — is never going to win any speed races.

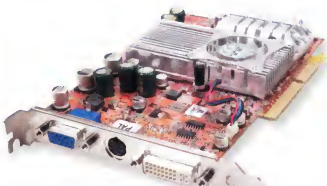
The GeForce FX5600 is punching out of its weight here, and it shows, earning less than half the score that its big bad FX5900XT cousins did in 3DMark2003. The first giveaway is when you see that this is the only GeForce FX tested that doesn't require external power. Sure the card looks fine — it actually looks more like a Radeon than a GeForce FX, thanks to the cut down PCB size. There are no heatsinks on the RAM, and only a low profile heatsink/fan combination on top of the GPU. There's no need for an elaborate cooling solution — the card's clock speed is too sedate to warrant it. Although the GeForce cards tend to run a lot hotter than Radeon cards, the small cooler on top of the GeForce 5600's GPU is roughly the same size as the smallest ATI units.

The main selling point of this card? Its 256MB of RAM. The main problem with this card? Any game likely to be needing 256MB of RAM is going to completely overwhelm this card in its requirements for clock speed. It's not much use being able to hold all that texture information if you fling it around in slow motion.

A few old games and demos are bundled with the card, and these perform well enough. But people don't buy video cards to play the bundled games adequately — they buy them in order to play games well. That won't happen with this card — and it certainly won't yield suitable results when the likes of Half Life 2 and Doom 3 come out.

In our opinion, the price of this card is extortionate — there are faster, better-priced alternatives in both Radeon and GeForce chipsets. The 256MB drawcard is a dud; there are better cards in this test with half that amount of memory.

Details	▶▶
Contact	Cassa Australia
Phone	(07) 3853 5444
Online	www.cassa.com.au
Price	\$399
✓	Decent build quality.
✗	Overpriced; poor performer.
Verdict	●●○○○



## ASUS Radeon 9600XT

The Radeon 9600XT is targeted squarely at gamers. A prominent sign on the box says "Half Life 2, Free Game". Quite a neat trick, given the fact that the game isn't out yet due to a developer delay. ASUS and other makers of ATI cards have had to resort to including a voucher, redeemable when the game is available. Whether the boxes were printed before the game was officially delayed, or it's merely an oversight by ASUS, it's poor form not to be more explicit.

Regardless of its marketing tactics in this case, ASUS' reputation comes from years of producing quality hardware, and this card continues the tradition. Atop an austere orange circuit board sits a very businesslike heatsink/fan combo, the sole concession to hardware glamour being one of the RAM heatsinks being sculpted into the ASUS logo.

The card's back plate features the expected DVI-I, VGA and TV-out sockets. ASUS also includes a DVI-I to VGA adaptor and a video in/out adaptor, which is a cut above the usual cable-based TV-out inclusion.

The packaged software contains the usual suspects — ASUS' proprietary DVD-playing software and media suites, as well as OEM editions of Ulead's Photo and 3D software. There are a few solid titles among the bundled games, but as mentioned, it's still missing the promised Half Life 2.

GameFace technology, which allows real time audio/video communications within games, is a neat inclusion. In practice, however, it's likely to steal precious bandwidth in online games and be more of a distraction than anything else. More useful is the included Video Security software — used in conjunction with a Web cam, it allows closed circuit-style monitoring and recording of given area(s).

As the benchmarks indicate, this card's performance ranks towards the rear of a tight pack of the Radeon 9600XTs reviewed here, and mid-range among all cards. Taken in isolation, the differences are relatively small compared with other Radeons, but the two GeForce FX5900XTs are clearly superior performers. The build quality of the hardware notwithstanding, ASUS's Radeon offering meets requirements, but doesn't leap out from the crowd.

Details	▶▶
Contact	Cassa Australia
Phone	(07) 3853 5444
Online	www.cassa.com.au
Price	\$399
✓	Sturdy build quality, video in/out capability.
✗	Misleading packaging; mid-range performance.
Verdict	●●●○○

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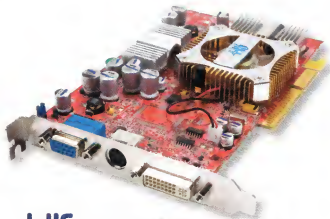
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## HIS Excalibur Radeon 9600XT

If it wasn't for the presence of GeForce FX5900XT's in this Labs Challenge, the HIS card would have edged out the competition for best performance across most tests. It tied with the Editor's Choice-winning Powercolor for first place in Quake III frames per second. It also beat the Powercolor by a small margin in UT, Aquamark, and both 3DMark2001 and 3DMark2003. Such results guarantee buyers that the card will see them through (at least) the next year's crop of games without performance disadvantage. Like the other top performers in this test, there is little price justification in moving to a cutting edge \$800+ card when this one comes within striking distance of the major benchmarks.

The main problem with the Excalibur is that other cards in this challenge outpace its strong points. It's not as fast as the Sparkle, doesn't have video in/out like the Powercolor, and lacks the chunky strength of the MSI. It's solid across the board, without standing out.

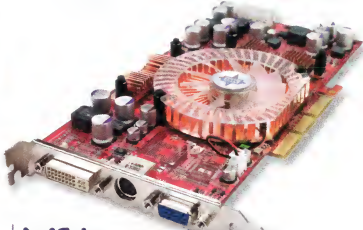
The cheap-looking HIS logo on the heatsink/fan combo makes the card look a trifle cheap, but it's strongly constructed. The standard DVI-I, TV-out and VGA ports are firmly affixed without any play, as are the heatsinks. On the underside of the card, four small sinks jut out roughly 7.5mm from the PCB surface.

An attractive bundle is also included. HIS wins kudos for being upfront about its Half Life 2 offer. Unlike ASUS, the company makes it clear on the box that the game isn't available yet. In addition to the voucher for Half Life 2, PowerDVD and PowerDirector and a 6-in-1 game bundle are included, plus TV-out and S-Video cables, as well as a DVI-I to VGA adaptor.

The Excalibur's benchmark figures are good enough for a rough third place on performance. But overall, they fall short of being good enough for the top spot for the same reason that the top-performing card, the Sparkle, didn't crack it — the lack of VIVO. Video card companies need to be proactive in this price range, especially if competitors over which they have only a small performance advantage include such features for around the same price.

The Excalibur card is a fine offering, but none of its value propositions outweigh the Powercolor or the Sparkle.

Details	
Contact	AKA Technology
Phone	(03) 9562 0022
Online	www.akatechnology.com.au
Price	\$309
✓	Solid performer, decent software bundle.
✗	No video in/out.
Verdict	●●●○



## MSI GeForce FX5700 Ultra

MSI has made the curious move of making sound a selling point in its GeForce FX5700 Ultra card. No, it isn't selling an integrated audio/video card; instead it boasts about how quiet the card is. A prominent badge on the box proudly proclaims 28dB maximum.

At first glance, the 128MB MSI sports-quality construction. An impressive copper heatsink/fan combo sits on top of the GPU, with video RAM protected by smaller sinks of the same material. However, the review card APC received wasn't a glowing example of quality control. The GPU heatsink was poorly attached. Two binding posts on diagonally opposite sides of the sink weren't enough to prevent the sink tilting upwards a few millimetres when lightly pressing on the edges of the fan. Doing this allowed us to peer under the sink and see the conductive compound between the GPU and sink stretching. The sturdy back panel of the card is free of such irregularities, featuring a standard layout: DVI-I port for connection to digital panels, TV-out socket and VGA port.

Thoughtfully, the power cable supplied is a double-adaptor, so you don't "lose" a power source when installing the board. There's also a DVI-I to VGA adaptor for those desiring dual monitor applications, as well as a TV-out cable.

The home entertainment focus of the card is apparent when the packaged software is taken into account. Tom Clancy's Ghost Recon, Elder Scrolls III: Morrowind and a dated Duke Nukem accompany a 7-in-1 games pack. InterVideo's WinDVD heads a list of useful utilities, including MSI's "unique weapon", the Media Center Deluxe II. The app functions as a launcher for music, video, images, games, TV and radio. Handy, but whether it's worth the claimed US\$1,200 is debatable.

In operation, the MSI card doesn't appear to be hampered by the wobbly heatsink issue. The benchmark figures posted by the card are in line with other FX5700 Ultra boards tested. The MSI came second only to the Albatron card in overall 3DMark2003 scores, with both cards being the only ones to break 4000 barrier. Even so, taking into account the build quality and the lack of standout performance elsewhere, it's hard to recommend it over its competitors.

Details	
Contact	MSI Australia
Phone	(02) 9748 0070
Online	www.msicomputer.com.au
Price	\$299
✓	Useful hardware and software inclusions.
✗	Questionable build quality; average performance.
Verdict	●●○○

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## MSI GeForce FX5900XT

The FX5900XT is a faster version of the MSI GeForce FX5700 Ultra, which includes RAM sinks, so why hasn't MSI bothered to put any heatsinks on the RAM chips surrounding the FX5900XT's GPU? As it's a GeForce FX card, this seems a glaring omission. That said, the card doesn't exhibit any irregularities associated with overheating, but having them in place is surely a safer long-term proposition than not doing so.

This idiosyncrasy aside, the FX5900XT is of quality construction. The power socket is securely bedded down on one end of the red PCB, while the back panel features DVI-I, VGA and video in/TV-out sockets.

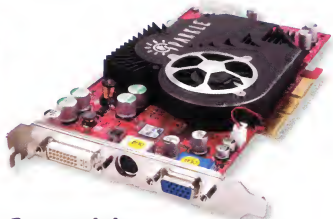
The MSI was one of two cards submitted that goes a step beyond the competition in fulfilling the sub-\$500 criteria, and it's a case of good news and bad news for MSI that it did so. Good news, because the faster-rated FX5900XT chipset belts the Radeon 9600XT's and lesser GeForceFX's convincingly; bad news because the other FX5900XT — the Sparkle — eclipses it in every benchmark category. Unlike the Sparkle, the MSI actually cops some stick in Aquamark from a couple of upstart Radeons — the ASUS and Powercolor. Both manage to interpose themselves between it and the top-ranked Sparkle by a handy margin.

Where MSI really racks up the points is in the bundle stakes. There's VIVO capability, a small adaptor box with sockets for all manner of connections, plus the standard hardware inclusions of a DVI-I to VGA adaptor and power cable.

Then there's the software. MSI has thrown in its Media Center Deluxe II, a launcher for virtually every type of media, as well as TV and radio functions. Also included are overclocking software, and a useful selection of games and utilities, together with a standard DVI-I to VGA adaptor and power cable.

The MSI is the second-fastest card in this roundup in most tests. It features a superior bundle to the fastest — the Sparkle — but is significantly more expensive. And our Editor's Choice — the Powercolor — even sneaks past it in a couple of benchmarks, and offers a competitive bundle and a saving of over \$100.

Details	▶▶
Contact	MSI Australia
Phone	(02) 9748 0070
Online	<a href="http://www.msicomputer.com.au">www.msicomputer.com.au</a>
Price	\$325
✓	VIVO; competitive performance.
✗	No RAM sinks, price.
Verdict	●●●●○



## Sparkle GeForce FX5900XT

What it loses in brand name recognition, Sparkle's GeForce card makes up for in performance and value for money. One of the cheapest cards reviewed, it's the hands-down winner in the benchmark stakes. With a score of 4,910, the Sparkle is the only card to really threaten the 5,000 barrier in 3DMark2003 — a leading performance that is reflected in all but one test score.

The Sparkle's build quality is satisfactory. All components are securely anchored on the circuit board, and the cooling solution — a black and silver heatsink/fan combination — covers the heatsinks and RAM completely. There was one niggle in the review board; its back panel, featuring TV-out, DVI-I and VGA ports was tilted slightly askew. This discrepancy wasn't enough to impede installation, but it does provide a hint of rushed manufacture.

An unusual feature on the card is a thin metal strip along its leading edge. If it's intended to provide protection, it's strange that no other card manufacturer has needed it to date. If its use is merely cosmetic or to function as a handle, it seems surplus to requirements.

A further clue as to how Sparkle save on costs is in the paucity of the bundle on offer. Where other manufacturers load their offerings down with a pile of extra software, Sparkle proves spartan: one bundled game (the RPG *Morrowind*) and a copy of *PowerDVD*. Finally, and most crucially — there is no VIVO functionality, something a few of the other cards have to offer. You should think carefully about your possible intentions with the card before buying — many users find this an important addition. If you like your hardware loaded with features, there are better package deals on offer, but you'll pay the price with power.

Critics might argue that pitting a GeForce FX5900XT card against lesser-class rivals like the FX5700 Ultra or ATI's Radeon 9600XT series is unfair. On paper they're right, but this price range is the domain of the bargain hunters. Buyers can't justify paying top dollar for the fastest cards on sale, but they want plenty of bang for their bucks. If you can do without VIVO, for roughly a third the price of a cutting edge card, the Sparkle offers a very attractive alternative.

Details	▶▶
Contact	Australia IT
Phone	(03) 9543 5855
Online	<a href="http://www.australiat.com.au">www.australiat.com.au</a>
Price	\$297
✓	Stellar performance, low price.
✗	No VIVO; limited bundle.
Verdict	●●●●○



# ATI's AGP8X fiasco

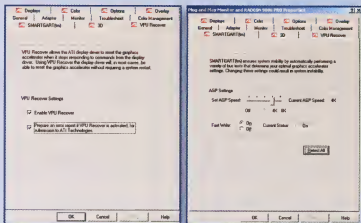
ATI's Radeon cards all exhibited some peculiarities in testing. Running 3DMark2003 resulted in a crash midway through, requiring a hard reset. Aquamark fared a little better. ATI's VPU Recover driver software would trap an error and allow the benchmark to proceed — albeit at an unknown cost to the final score. Even the tried and tested Quake III demo would hang with a corrupted screen before delivering an abrupt return to the desktop.

Further testing revealed that benchmarks using DirectX 9.0 ran a fraction of the card more frequently than those involving OpenGL when the cards were set to their maximum performance levels — including AGP8X mode.

Such lockups have multiple causes. ATI's online "infobase" acknowledges the problem with its article "3D applications may hang on some AGP 8X capable systems" ([www.ati.com/support/infobase/4219.html](http://www.ati.com/support/infobase/4219.html)). Its solution — switching the video card to AGP 4x operation — works, but there is no explanation as to how or why the problem occurs.

In the past, Radeon cards have had compatibility issues with certain new 8X compatible motherboards. The most common solutions have been to tweak the AGP voltage settings on the board, and to install updated Intel chipset drivers. Users upgrading from an nVidia card are further advised to apply a utility such as Driver Cleaner ([www.driverheaven.net](http://www.driverheaven.net)) to remove all traces of nVidia's Detonator drivers.

The cost to performance by switching to AGP 4X is negligible in practical usage. Typical applications rely much more on the card's GPU than its ability to pump critically large amounts of data across the AGP bus.



► **Driver error:** sadly, tweaking AGP settings is the best way to avoid system instability.

What is of concern is that ATI has had ongoing issues with AGP 8X since the release of its Radeon 9700Pro, the first card to overthrew nVidia's dominance in the speed arena.

nVidia isn't in the clear either when it comes to compatibility issues, although that company's problems are more due to speed than outright functional impairment. Once again, DirectX 9.0 is implicated — its native 24-bit colour mode is less than nVidia's GeForce FX 32-bit standard.

GeForce FX cards incur a performance overhead when converting their image quality down to the DirectX standard in applications using Microsoft's API. nVidia's engineers are yet to advise what measures are being taken — if any can be — to address this at the hardware level.

Card	Powercolor Radeon 9600XT Bravo	Albatron GeForce FX5700 Ultra	ADOpen Anolus GeForce FX5700 Ultra	ASUS GeForce FX5600	ASUS Radeon 9600XT	HiS Excilibur Radeon 9600XT	MSI GeForce FX5700 Ultra	MSI GeForce FX5900XT	Spitfire GeForce FX5900XT
Price	296	297	TBA	299	299	309	299	325	297
3DMark2001	12,747	11,855	12,009	9,020	12,504	995.4	11,824	13,207	13,283
3DMark2003	3,844	4,193	3,724	3,734	3,824	1,971	4,014	4,781	4,911
3DMark fill rate (single-texturing, Mtexels/s)	1,016.2	1,155.2	1,226.7	701.0	913.5	995.4	1,155.3	1,284.0	1,356.5
3DMark fill rate (multi-texturing, Mtexels/s)	1,802.6	1,323.8	1,598.8	1,014.0	1,831.3	1,677.4	1,524.6	2,795.1	2,848.0
3DMark (pixel shader, fps)	32.1	21.0	21.9	11.4	32.3	34.1	21.8	33.7	34.4
UT Demo (Flyby)	183.30	178.15	178.35	112.31	175.29	184.07	178.19	210.88	212.56
UT Demo (Botmatch)	79.26	79.62	74.28	66.54	79.29	79.51	79.78	72.93	72.97
Q3 Test	245.3	197.7	201.6	168.0	237.8	245.3	197.4	279.8	271.9
Aquamark	31,069	29,384	27,005	16,633	31,290	30,297	29,379	30,827	31,405
Memory	128	128	128	256	128	128	128	128	128

## Quick draw

Forget pen and paper, graphics tablets are the way forward for all of your digital drawing needs.

**Bill Bennett and Jon Harsem sign off on five of the finest.**

Mice and trackballs are efficient at moving a cursor around the screen, but illustrators, architects and designers need control that's a little more finely-tuned. When it comes to serious drawing on a computer, graphics tablets are the way to go.

Larger, more expensive graphics tablets with an A4-sized active drawing area are aimed at design professionals. Smaller, cheaper tablets are aimed at hobbyists and people with less demanding needs. The more compact tablets are particularly

### How we tested

All the graphics tablets were tested on two systems. The main machine was a 2.4GHz Pentium 4 with 192MB of RAM, USB 2.0 ports and running Windows XP. We also tested for compatibility on a Windows 98 system with a 333MHz Pentium II, 192MB of RAM and USB 1.1 ports.

popular in Asian markets, where they can be used to input complex language characters.

Graphics tablets can't really be described as a fast-moving market sector, and many of the products have been around for a while. Although all work with Windows XP, you'd be hard-pressed to find other markets in which manufacturers regard Word 97 compatibility as an issue. On the other hand, a lot of the non-design applications of graphics tablets are now catered for by tablet PCs.

## Wacom Graphire3 G-630



Wacom's Intuos2 beats this model on features and performance, but most users will find the Graphire3 the best buy: it has three-quarters of the Intuos2's functionality at one-third of its price.

The G-630's 208 x 148mm active area is plenty for day-to-day drawing and other apps, but it probably won't satisfy graphics professionals. This is less than half of the unit's total footprint, but feels well built and doesn't slide around the desktop.

There are 512 levels of sensitivity and a resolution of 2,032 lines per inch (lpi), which is adequate for most users. Wacom's Pen Plus Personal software integrates smoothly with Microsoft Office, and its bundled programs include Corel Painter Classic, a newer application than those supplied with the other tablets here.



Wacom doesn't include a mouse with the Graphire3, but you can buy one for \$28. Thankfully, an excellent pen is provided: it resembles a ballpoint, is lightweight and

doesn't require batteries. If upgrading from an earlier model, your pens and mice will also work with

the G-630.

The only thing missing is a pen stand (another optional extra). Another alternative is the smaller Graphire3 G-430 (\$136), which has an active area of 128 x 94mm.

#### Details

Contact	VideoBytes Australia
Phone	(03) 9348 9177
Online	www.videobytes.com.au
Price	\$264
✓	Construction; design; software.
✗	No mouse.
Verdict	●●●●●

## Acecad Acecat Flair

With an active drawing area of just 127 x 95mm, Acecad's Acecat Flair is the most compact tablet in this roundup. It takes up about as much desktop space as a mousepad and is solidly constructed, despite being only 7mm thick. This makes it handy for mobile use, though at around 500g it could be lighter.

In practice, it's too small for serious graphics work — there's not even enough room to capture a confident signature. Handwriting recognition is well-nigh impossible, and isn't supported by the software anyway.

The Flair feels more restrictive in use than competing models. However, it's more than adequate for writing pictograms and passes muster for simple photo touch-ups and similar consumer-oriented graphics applications. A comfortable battery-powered pen is supplied, but you may have difficulty tracking down the AAAA battery it requires



when it eventually needs changing. Resolution is claimed to be 2,540lpi, however in practice we found there wasn't a true enough feel

to make use of all 1,024 levels of pen sensitivity. Overall build quality is adequate, and the Flair ships with a penholder and spare nibs. The bundled software underlines its hobbyist orientation by including MetaCreations Art Dabbler, an ancient and cut-down version of Fractal Painter.

#### Details

Contact	Capax Technology
Phone	(02) 9648 4977
Online	www.capaxtech.com.au
Price	\$125
✓	Solid construction.
✗	Much too small for serious use.
Verdict	●●●○○

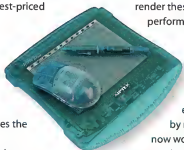
## Aiptek HyperPen 6000U

At just \$99, Aiptek's Hyperpen 6000U is the lowest-priced tablet in this Labs Challenge, and has a bargain-basement feel to match.

With a 154 x 114mm active area and 12 user-assignable buttons across the top, the pad provides a reasonable surface for a tablet of this class. It's only 10mm thick and comes in a transparent blue plastic that almost looks cool, in an iMac kind of way, but in fact underlines the flimsiness of its construction.

Its pen and mouse are worse — they feel as cheap as they look. Both devices have three buttons, but the ergonomics are so neglected that the buttons are not easy to use.

On paper, its 512 pressure-level capabilities and resolution of 3,048dpi in the pad are impressive. Although the pen and mouse



render these numbers meaningless, in practice its hardware performance is adequate.

But we can't say the same for its software, which might have been of the prevailing standard eight years ago, but by modern standards is now woefully out-of-date. The annotation program is designed to work with Word 97 and its manual says it is compatible with Windows 98 only, but it works with XP as well.

Details	
Contact	Bu-Tek Industries Pty Ltd
Phone	(03) 9558 9788
Online	www.bu-tek.com.au
Price	\$99
✓	Low price.
✗	Ancient software, poorly designed pen and mouse.
Verdict	●●○○○

## Aiptek HyperPen 12000U

In many respects, Aiptek's HyperPen 12000U is similar to the smaller HyperPen 6000U, although its pad has a much larger active surface and a totally different construction.

The poor-quality pen and mouse combo from the 6000U reappear, with the same (theoretical) 512 pressure-level capabilities and 3,048dpi. There's a comparable lack of documentation, along with a similar, though not identical, out-of-date software bundle. The apps remain the same, but the larger model includes updated drivers and support for the Mac OS.

While the kind of user likely to spend \$400 on a graphics tablet will probably already own more up-to-date professional applications, you can't help thinking that Aiptek is pushing its luck as far as customer goodwill is concerned by bundling ancient software with the HyperPen 12000U. It certainly doesn't inspire confidence in the driver software,



which is a shame, given that it works flawlessly.

The pad is of more solid construction, with 24 programmable buttons, but its two-dollar shop looks are unlikely to endear it to design-conscious graphic artists.

The active area measures a respectable 300 x 224mm, but the unit occupies almost twice as much desktop real estate. Despite this extra room, however, there's nowhere to rest your wrists, which makes it uncomfortable to use.

Details	
Contact	Bu-Tek Industries Pty Ltd
Phone	(03) 9558 9788
Online	www.bu-tek.com.au
Price	\$399
✓	Price.
✗	Ancient software, poor mouse and pen.
Verdict	●●○○○

## Wacom Intuos2

It's not cheap, but the Intuos2 delivers everything you could wish for in a tablet, and it does it with great style. This is a professional tool, and is priced accordingly.

The Intuos2's physical construction is gorgeous. Its pad has a smooth, solid feel and slight curves. It has an active area of around 230 x 315mm, 22 buttons across the top, a penholder and a rubber strip that adjusts the tablet's angle.

You'll find other pads with a higher resolution than the Intuos2's 2,540dpi, but in practice, this is ample. And its 1,024 levels of sensitivity and five-button mouse come into their own when dealing with 3D material and video.

The rubberised three-button grip stylus comes with spares for the grip, button and nib. More comfortable and responsive than any



rival model, this high-grade Wacom also doesn't require batteries.

The Intuos2 is the only tablet in this review to allow for multiple tool identities which recognise different pens and mice, giving different settings for each: think blue pen, red pen.

Tools include spray pens and crosshair-mouse, and the board also detects their tilt, allowing for true spray cone simulation with the appropriate tool.

Details	
Contact	VideoBytes Australia
Phone	(03) 9348 9177
Online	www.videobytes.com.au
Price	\$832
✓	Construction, design, quality; software.
✗	Expensive.
Verdict	●●●●●



## COMING TO A DESKTOP NEAR YOU...

*As we prepare ourselves for JGitz processors and beyond,  
Matthew Overington looks into the APC crystal ball to reveal  
the CPUs of the not-so-distant future.*



**P**rocessor technology is currently the fastest developing industry in human history, and it's not showing any sign of letting up. While current 3GHz powerhouses are ample for the majority of today's desktop apps, it's inevitable that the strain on our silicon will grow as applications get more complicated and operating systems more bloated.

Microsoft itself announced that when Windows Longhorn is released in 2005, the average computer will be running at a clock speed of several gigahertz, and will include a wide-screen display and terabyte hard disk. (Given the woeful performance of the Longhorn Professional Developers Conference (PDC) beta release, computers will have to be much faster in the future to handle the demands of just running the OS.) LaCie recently announced the availability of its terabyte drive, and wide-screen LCD panels are dropping in price on a daily basis, so Bill Gates wasn't too far off the mark during his PDC

keynote last October. The industry's major players — AMD and Intel — can't afford to rest on their laurels and have been researching their own unique tricks to squeeze every last drop of performance out of current CPU designs.

While home users tend to upgrade platforms as finances allow, the question of when to shell out for new hardware is crucial for corporate customers. The costs associated with outfitting an entire corporate fleet or back office are phenomenal, and keeping spending in check is imperative for any IT department. As a new platform is released, products built on the previous generation of architecture drop in price and filter down to the mainstream. Companies rarely shell out for the latest and greatest — especially for desktops — but instead wait until hardware is one or two generations old before buying. While AMD was decidedly once David to Intel's Goliath, the gap is narrowing as AMD's Opteron server line picks up strong sales.

With AMD investing heavily in 64-bit technology and Intel releasing bridging products such as the Pentium 4 Extreme Edition and Prescott, there's never been a better time to examine what's in store for the next few years. Substantial moving and shaking is in the works for systems as manufacturers grapple with new manufacturing techniques and the ever-growing challenge of meeting Moore's Law.

#### MORE AND MOORE

Moore's Law states that the number of transistors on an integrated circuit will double every two years. Although Gordon Moore initially made the statement as an observation in 1965, the press picked up on it and over time it became a law to which all chip manufacturers have tried to adhere. It has held true until now, but unwanted side effects of shrinking processors means that conventional production techniques will need rethinking in the near future.

Keeping up with Moore's Law was the Holy Grail in terms of engineering goals for processor designers: while this has helped chip developments up until now, the law has also been a hindrance in terms of driving CPU innovation. Engineers have been able to rely on improved production techniques to shrink die sizes and cram more transistors into a given space, thus keeping up with Moore's edict. It has also led to a lack of real innovation in the CPU space until relatively recent times, when vendors finally started looking at adding instructions, innovations like Hyper-Threading, and multicore processors. While the industry's major chips once looked similar architecturally, AMD and Intel are increasingly heading in different directions to reach the same goal.

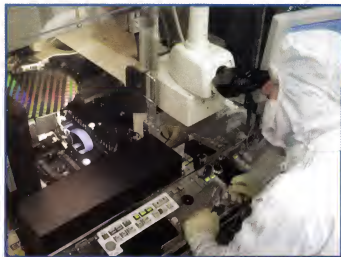
#### GOLIATH

Intel is the current industry leader in CPU manufacture. The company boasts the most advanced production facilities of any modern chip builder, including 25 fabrication plants worldwide with at least 10 of those producing CPUs. While incumbents have pushed Intel to re-examine its strategies in recent years, it's not hard to see why Intel is the ahead of the pack given this massive investment.

Since around 1999, Intel has claimed that the Willamette Pentium 4 would be the last IA32 CPU it would produce, and after that the company would transition to its IA64 architecture. Unfortunately, uptake of Intel's 64-bit CPUs has been slow, and the ecosystem of IA64 applications Intel anticipated hasn't eventuated. Many companies are looking at AMD's solution that can run both 32- and 64-bit applications natively at a lower cost than Intel's offerings to provide some flexibility, but Intel has committed to further 32-bit processors. The fact is that current 32-bit designs suffice for most applications and the 32-bit platform still has some life left in it.

On 2 February 2004, Intel announced the next processor in its Pentium 4 line-up, previously codenamed Prescott. The Pentium 4 SSE3 processor extends the life of the already-aging Pentium 4 platform well into 2005.

Prescott is the first of Intel's desktop processors to be built on a 90 nanometer (nm) process and boasts impressive — though not groundbreaking — specs when compared to current Pentium 4s. The 90nm chips include 16KB of Level 1 cache and 1MB of Level 2 memory. They still rely on the same NetBurst architecture and long 20-stage instruction pipeline, but benefit from added instructions, initially dubbed Prescott New Instructions (PNI) but later renamed SSE3.



▶ **Wafer thin:** Intel's current 300mm wafers double chip output over previous versions.

Prescott also includes antivirus technology to help prevent buffer overflow attacks. Worms often use buffer overruns to force an instruction to execute. They work by flooding the CPU with information and then slipping an instruction into memory while the CPU is overloaded, which is subsequently executed. The technology is new to Intel, despite the fact that AMD initially designed it (dubbed "Execution Protection") into its Athlon 64 chips. Unfortunately, it won't actually work under Windows until Microsoft releases Windows XP SP2, which is due later this year (see our preview on page 44).

The new processor launched at 2.8GHz, 3.0GHz, 3.2GHz and 3.4GHz, but this will be ramped up throughout 2004. New Celerons will be launched soon after. It's expected that the Prescott core caps at around 4GHz, which is where the next generation, Tejas, steps in. Tejas is set to be the successor to Prescott, and the final swansong of the Pentium 4 platform... again.

#### ECONOMICS

The transition to 90nm technology means that Intel is looking at using smaller wafers and shrinking the CPU die from its current 130nm process. Intel anticipates that it can use 75% of its existing fabrication plants for the next generation of chips, which has a significant effect on the total cost to produce the chips in volume.

Intel currently employs 200mm wafers in the majority of its plants, though a few 300mm wafer dies are also used to build chips. Intel claims that the 300mm wafer approximately doubles the chip yield when compared to a 200mm one, which in turn reduces the cost of manufacture for each individual chip by 30%. This makes for compelling economics. Current generation processors are predominantly produced on the 200mm wafers, but the 90nm chips will all be produced on the larger dies. This means that Intel is able to quickly recoup the research and development costs and pass on these savings to



▶ **Old school:** Intel's current top-performer is the lost to be built on the 130nm process.





► **Fancy plants:** Intel has the largest catalogue of fabrication plants of any manufacturer.

consumers. The top Prescott processor retailed for US\$417 at the time of its launch.

## SOCKET TO ME

The first generation Prescotts use the same socket as existing Pentium 4 CPUs (Socket 478), but this is also to be upgraded in the first half of 2004. Intel currently relies on the FCPGA package for its processors, but it has also announced a new socket to meet the needs of upcoming chip designs. The company has decided to abandon processor pins in favour of a ball grid that slots into pins on the motherboard.

The Socket T (775 pin) solution will be included on motherboards sporting the new Grantsdale chipset. Grantsdale is slated to serve as the successor to Intel's entry-level i865 (Springdale) chipset. It will be available in a number of different versions including a vanilla option and one with a graphics core. The chipset features support for DDR 333/400 and DDR-2 400/533 RAM, the NewCard expansion card for Wireless, PCI Express, and SerialATA. The ICH 6 southbridge will be mated to these boards to provide four Serial ATA connectors, eight USB 2.0 ports, plus FireWire and RAID functionality.

Intel is also looking at releasing Alderwood, the successor to the i875 (Canterwood) performance chipset shortly after. If Alderwood keeps the tradition of other Intel performance chipsets, it should feature improved memory performance over Grantsdale. Both will feature Intel's Extreme Graphics 3 engine, which provides a substantial boost in frames over existing on-chip graphics solutions.

## EVERYTHING'S BIGGER IN TEJAS

Tejas, the last processor in the Pentium 4 family, is due out early in 2005. Initially it'll be built on the same 90nm process as Prescott, but

this will move over to a 65nm process late in 2005. The chip is slated to boast a 24KB Level 1 cache and 1MB of Level 2 cache (although this will be increased to 2MB when the processor switches to 65nm fabrication). The processor is said to include an 800MHz quad-pumped bus, but there's a slim chance it could reach 1,066MHz. As with Prescott, Intel is looking to add even more new instructions, currently dubbed Tejas New Instructions (TNI), which may include advanced stream processing technology. Rumours that the Prescott core supports 64-bit extensions have proven unfounded, and it's expected that limited 64-bit functionality, codenamed Yamhill, is set to debut in Tejas. One of the problems facing designers at the moment is that of heat. Tejas prototypes are said to draw around 150W, which is a significant boost from the 85W seen in current-generation Pentium 4s. This is likely to mean that the core will undergo significant changes before its release.

A new chipset (codenamed Lakeport) designed to complement Tejas will launch in 2005. Two versions are expected: Lakeport-G and Lakeport-P, with the latter not featuring an integrated graphics core. Both chipsets support Socket 775 processors and 800, 1,066 and possibly even 1,333MHz quad-pumped bus speeds. By then, DDR-2 memory support will be standard, along with 667MHz memory clock speeds.

Tejas is meant to suffice until Intel releases the ultimate successor to the Pentium 4 sometime in 2006 or 2007. Little is known about the chip other than its codename (Nehalem), and that it's expected to include several processor cores — a technology currently being worked into servers.

## VANDERPOOL

The chip manufacturer made some announcements at the 2003 Intel Developers Forum (IDF) regarding the next generation of processors that will eventually succeed the single-core desktop chips, currently codenamed Vanderpool. The concept behind Vanderpool is the idea of multiple cores existing in a single CPU. Each core is free to work independently of the others — while one can be dedicated to decoding an MPEG-2 DVD stream, another can be running system processes, while another drives a game. This is the technology that will drive Bill Gates' vision for Longhorn to serve as the media centre in the home, but don't expect it on the desktop until at least 2006-2007.

## LAGRANDE

Meanwhile, Intel is working on a technology to incorporate in its processors to help secure computing. It has become obvious that software-only protections are flawed, as evidenced by the barrage of

## Desktop processors

		Today	H1 2004	H2 2004	H1 2005	H2 2005	H1 2006	H2 2006
Intel	High End	Prescott 130nm		Prescott 90nm		Tejas 90nm		Nehalem
	Low End	Celeron 130nm		Celeron 90nm				
AMD	High End	Athlon 64 FX 130nm		San Diego 90nm		Toledo 90nm		
	Mid-range	Athlon 64 130nm	Athlon 64 'Newcastle' 130nm	Winchester 90nm				
		Athlon XP 130nm		Paris 130nm		Palermo 90nm		
	Low end	Duron 130nm						



▶ **The road ahead:** Intel has grand plans for the future, including a massive multicore behemoth codenamed Tukwila.

worms targeting Microsoft's Windows platform in 2003. LaGrande is essentially a hardware approach to protecting data that cordons off an area of the CPU for security work. This special area can't be accessed by external connections, so any data residing there is completely secured. LaGrande is a key part of Microsoft's Next Generation Secure Computing Base (NGSCB), which will be a feature of Longhorn. Intel's president Paul Otellini says we can expect to see an Intel chip featuring LaGrande technology in two or three years, so it'll probably be rolled into Tejas.

#### ON THE ROAD AGAIN

Intel has been uncharacteristically tight-lipped about upcoming movements in the mobile space. It planned to release the successor to the current-generation Pentium M CPU, codenamed Dothan, early in 2004 but delays have pushed this back until halfway through the year.

Intel is extremely serious about the ever-growing notebook market and sank US\$300 million into the advertising campaign for the Centrino platform. It can't afford to release a sub-par chip and tarnish its reputation, so pushing back the release date is wise. Centrino-based notebook owners are hardly screaming for more performance yet anyway.

Built on the 90nm process, Dothan includes a 2MB cache and is set debut at 1.8GHz. The processor will serve as Intel's flagship mobile unit until 2006, but it won't necessarily beat the existing Pentium M design in terms of power consumption due to the higher clock speed and larger cache. Current Pentium M chips draw about 24.5W, while the Dothan processors will draw around 30W. Low-power portables will continue to spec the Centrino triumvirate,

at least in the short to medium term. A processor codenamed Merom will follow Dothan, but little has been revealed about it so far. It's expected to come with support for upcoming technologies like DDR-2, NewCard and PCI express in 2005. Again, new mobile Celerons and low voltage versions of the Dothan chip are expected to follow after the initial launch.

Intel is also going to strengthen the wireless capabilities of the platform with the release of the Calexico2 802.11a/b/g network solution, adding 802.11a functionality in over Intel's Pro/Wireless 2200BG option.

#### SERVING UP A TREAT

The Itanium has suffered less-than-impressive sales, especially following the launch of AMD's Opteron platform in 2003. While Intel's Otellini was busy boasting about how "2003 was the year of the Itanic", sales on Itanium machines almost broke the 5,000 units per quarter mark. AMD's Opteron platform — which has been on the market less than a year — already sees more than 10,000 units shipped per quarter.

Intel is hoping the launch of its upcoming Montecito processor will turn the tide. The chip will have two separate cores at its launch in 2005 and 18MB of Level 3 cache. Intel's original plan was to release Montecito as a single-core processor in 2004 and then follow with the dual-core Shavano processor in 2006. These plans were later changed, and Montecito and Shavano become one. Montecito stands to be Intel's first billion-transistor processor and is slated to be two to three times faster than existing Itaniums.

Following on from Montecito is the biggest, fastest, most advanced chip that Intel has ever planned. The upcoming Tukwila



processor is tipped to be up to 10 times faster than current Itaniums. Tukwila will be the first multicore processor built on Vanderpool technology and features up to 16 cores. Just don't expect to see it until around 2007.

Intel is also preparing to release the next Xeon MP, codenamed Gallatin, early in 2004. The processor uses the 90nm process and feature 4MB of Level 3 cache. The following processor in the Xeon MP line, codenamed Potomac, is also slated for release early in 2005. Potomac is slated for construction on a 90nm process and is designed for 4- and 8-processor systems. There's a good chance the Yamhill 64-bit extensions will make it into the chip, too. Yamhill is the codename given to an attempt by Intel to add a set of 64-bit extensions to existing 32-bit chip designs to provide 64-bit functionality and bridge the gap between existing 32-bit and x86-64 systems. This means that both AMD and Intel would have x86-64 processors in server platforms, which would be a massive boon to consumers as there'd be a single platform choice for running software apps.

In the meantime, Intel is boosting the cache on current Prestonia Xeon DPs up over 1MB. The upcoming Nocona Xeon DP chip will debut at 3.2GHz, feature 1MB of Level 3 cache and run on an 800MHz frontside bus, up on Prestonia's 533MHz while Jayhawk, due in 2005, will feature a faster bus again.

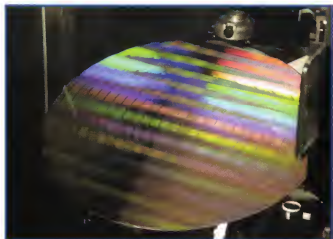
Paul Otellini said that Tulsa, the Xeon due after Potomac, would be dual-core. The chip, slated to be built on the Prescott core (or Tejas), will feature two threads and run at a clock speed around 1,066 or 1333MHz.

## WHEN I'M 64

Just as the details of Tukwila are emerging, it's becoming obvious that Intel has to do something radical to make up for its poor Itanium sales.

Rick Whittington, an analyst at American Technology Research, has gone out on a limb by saying that an x86-64 processor will soon arrive from Intel, which won't help Itanium's market share. He also suggests that Intel will unveil plans on an x86-64 chip late in 2004 for delivery in 2005 — although it's unclear if he's referring to a pure x86-64 chip or one that features the Yamhill extensions.

AMD and Intel having similar products on the market would push 64-bit machines down into the low-end server market. This will



► **Spin that wheel:** Intel has plans to migrate all production to 90nm facilities.

eventually spell the demise of the Itanium platform and announce x86-64 as the dominant 64-bit architecture. Perhaps Intel keeping up with the Joneses would be the best thing for AMD, as the upstart currently has a more significant investment in 64-bit machines.

## DON'T UNDERESTIMATE THE UNDERDOG

AMD is undeniably the underdog in the CPU wars. While Intel boasts countless fabrication plants across the globe, most of AMD's high-end chips come out of a single manufacturing facility in Dresden, Germany. In fact, it's only through clever product development that AMD is still in the game.

AMD's flagship line of desktop and workstation processors turned heads when they were finally released late in 2003 after a string of delays. While initial benchmarks weren't impressive, as Microsoft hadn't yet managed to prepare an operating system for the platform, the architecture showed promise. The ability to execute 32-bit and 64-bit applications natively side-by-side was a feat Intel had dismissed as impossible a decade earlier. While initial uptake was slow, Microsoft recently put the near final version of Windows XP for the Athlon 64 processor on its MSDN download page, and sales are expected to increase (see our Athlon 64 review on page 40).

AMD's own roadmap suggests the company will shortly release an update to the Athlon 64, currently codenamed Newcastle. Designed for the upcoming Socket 939, the chip features 512KB of

## Server/workstation processors

		Today	H1 2004	H2 2004	H1 2005	H2 2005	H1 2006	H2 2006
Intel	High End	Itanium 2 Multiprocessor			"Montecito" 90nm			"Tukwila"
	Mid-range	Itanium 2 Dual Processor Itanium 2 Low Voltage Dual Processor Xeon Multiprocessor	"Gallatin" 90nm		"Potomac" 90nm			"Tulsa"
	Low End	Xeon Dual Processor	"Nocona" 90nm		"Jayhawk" 90nm			
AMD	High End	Opteron (1-8 way) 130nm		"Athens" (1-8 way) 90nm		"Egypt" 90nm		
	Mid-range			"Troy" (1-2 way) 90nm "Venus" (1 way) 90nm		"Italy" 90nm "Denmark" 90nm		
	Low End	Athlon MP (1-2 way) 130nm						

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**\$289** RRP Wireless 802.11b version

## USB/Ethernet ADSL Router

The Billion 7100S features SOHO Firewall security with NAT technology and Packet filtering, URL Filtering, Universal Plug and Play (UPnP), Web based configuration, firmware upgrade and much more.



**\$129** RRP

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The Billion 7500WG is our flag ship 4 port ADSL Router model. Packed with features including a built in 802.11g Wireless Access Point with WPA support, built in VPN server with up to 16 tunnels, SPI Firewall, Parental control with URL blocking, Dynamic DNS, Syslog monitoring.



**\$369** RRP

## 4 Port ADSL Router

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► **Hot item:** AMD's Opteron platform has taken the server market by storm.

Level 2 cache. Socket 939 replaces Socket 754 and features dual-channel support and a 128-bit memory interface. Opteron systems will continue to employ Socket 940. Newcastle will continue to use the existing 130nm core, before transitioning to the 90nm Winchester core late this year.

Vanilla Athlon 64s should all feature 512KB of Level 2 cache when the switch to the smaller manufacturing process takes place. Winchester is also set to run on the Socket 939 processor slot, which should make its way onto Athlon 64 FX boards with the launch of the 2.4GHz Athlon 64 FX-53 in the second quarter of 2004. Socket 939 will be used for the Athlon 64 and FX processors from the second quarter of 2004 onwards.

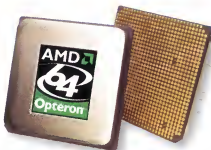
In the latter half of 2004, the FX range switches over to a 90nm process, currently codenamed San Diego. It keeps its 1MB of Level 2 cache, meaning that by the end of 2004, the only difference between the Athlon and Athlon FX lines of processors will be cache size — a move that will make life easier for consumers.

A Socket 754 version of the Athlon 64 3700+ is slated for release around May this year, with a clock speed of 2.4GHz and 1MB of Level 2 cache. This is the last Athlon 64 with 1MB of Level 2 cache before the chip moves over to Socket 939. The first Socket 939 version of the chip (also due in May) will feature 512KB of Level 2 cache and run at a clock speed of 2.4GHz. The only difference between the two is a 128-bit memory controller fitted to the latter processor.

AMD claims that the memory controller makes up for halving the Level 2 cache, but APC remains skeptical. Expect to see complete tests as soon as we can get our hands on samples. Later in the year a third version of the chip built on the 90nm process will be released, also for Socket 939 and flush with 512KB of Level 2 cache.

The 130nm Athlon XP gets another lease of life when it's released for socket 754 in the second half of 2004. The chip, codenamed Paris, is essentially a stripped-down Athlon 64 with 256KB of Level 2 cache and its 64-bit extensions disabled. This is expected to remain current until its successor, Palermo, is released late 2005 or early 2006.

There's no ongoing plan to ramp up the Duron processor past the 180nm process. Expect the present-generation Durons to be available well into 2005 and early 2006 provided consumer demand extends that far. AMD hasn't released any information on a successor, indicating the processor will be phased out as alternatives arrive.



#### UPWARDLY MOBILE

AMD is yet to make a significant impact on the mobile market against the marketing whirlwind of Intel's Centrino platform. The company is due to release a 130nm Mobile Athlon 64 processor in the first half of 2004, and upgrading around the middle of the year to Odessa. Odessa will initially be produced on a 130nm core before switching 90nm process later this year for a chip currently codenamed Oakville. Expected to last well into 2005, Oakville should run on Socket 754 and feature 1MB of Level 2 cache and be the same as the first-generation chip except for the smaller die size.

In a similar fashion to the desktop lines, the existing Athlon XP-M processor continues production, eventually leading into Dublin late this year. Dublin's production is based on a 130nm process, but it's planned to move to the 90nm process late in 2005. The chip is set to run on Socket 754 and feature 256KB of Level 2 cache. The codename for the 90nm version is Trinidad, but as yet little is known about this processor save its working title.

#### OPTERON AND ON

AMD's Opteron servers have been enjoying massive sales since they were launched in 2003. AMD is already shipping 10,000 units per quarter, thanks largely to the low cost and high performance offered by the systems. In fact, AMD's sales have been so strong that analysts predict Intel will follow with x86-64 processors within the next year. This leaves AMD with most of 2004 to add to its market share — an attractive proposition for shareholders.

At the moment, the Opteron range is destined to keep the Socket 940 processor but the entire range will switch to a 90nm process around August this year. The 90nm versions are currently codenamed Venus, Troy and Athens, for the 1-way (100-series), 2-way (200-series) and 8-way (800-series) systems.

The next major upgrade is due early in 2006 when AMD introduces the new K9 core in its Denmark, Italy and Egypt Opteron lines. Denmark is the successor to Venus, while Italy follows Troy and Athens leads into Egypt.

The K9 core is AMD's most optimistic venture to date, and what little specs are currently available are extremely impressive. A Japanese Web site broke some information in October 2003 suggesting the chip would run at 10GHz with a threaded architecture. Massive multiprocessor systems are slated, far eclipsing Opteron's limit of eight processors. Security is also set to play a major role, as AMD will adopt a system similar to Intel's LaGrande technology. The K9 chips will debut on the 90nm processor and feature three HyperTransport links.

A new socket will also be featured with the K9, providing a tweaked version of AMD's Hypertransport engine to support the three links, compatibility with DDR-2 533/666 RAM and PCI Express.

#### Mobile processors

		Today	H1 2004	H2 2004	H1 2005	H2 2005
Intel	High End	Pentium M 130nm		"Dolmen" 90nm		
	Mid-range	Mobile Pentium 4 130nm				"Merom" 90nm
	Low End	Celeron M 130nm				
AMD	High End	Athlon 64 130nm	Mobile Athlon 64 130nm	"Odessa" 90nm	"Oakville" 90nm	
	Low End	Athlon XP-M 130nm		"Dublin" 130nm		"Trinidad" 90nm



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# Feature

Unfortunately details on the core are few and far between as the processor is at least two years away. As yet, there are no scheduled upgrades to the existing Athlon MP range.

## AROUND THE CORNER

AMD announced plans to migrate to 45nm transistors at the 2003 IEEE International Electron Devices Meeting (IEDM) in Washington. This migration isn't expected until at least 2006, though. The biggest problem facing chip designers in 2004 is that of current leakage within the processor. As current leaks from a circuit, the voltage must be increased to keep the transistor working effectively. Unfortunately this leads to more heat, which also adversely affects how a transistor runs. It's imperative for AMD to stay on top of this if the company is to shrink its production down to 45nm. Intel's plans in the short to medium term are to hit a 60nm process, but AMD's are more ambitious.

There are two ways in which current can be leaked in a CPU. The first is across the transistor gate where electrons move from the negatively charged substrate to the positively charged gate. The second occurs when electrons move from the negative terminal to the positive one spontaneously through the silicon under the transistor channel.

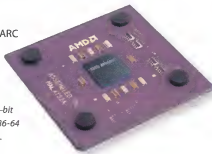
Chip designers rely on a layer of non-conductive silicon dioxide to insulate the gate from the channel, but the effectiveness of this layer depends on thickness. The thicker the layer is, the better the insulation and lower the current leakage, which leads to a more efficient processor. The only problem is, the thicker the layer, the larger the entire transistor, and the greater the distance between transistors.

Since adherence to Moore's Law requires the transistors to be packed onto a grid in ever-higher densities, there is obviously a limit to the amount of shrinking that can be done without compromising the effectiveness of the silicon dioxide layer. Chip manufacturers have been looking at other materials that could work as an insulating layer, as the silicon dioxide layer has a minimum workable thickness of 2.3nm before gate leakage becomes too great. Eventually, the problem of gate leakage will be enough to bring an end to the validity of Moore's Law. The current production methods will remain in use at least for the next couple of processor iterations, but meanwhile chip manufacturers are looking at adding further instructions, cache and 64-bit extensions to maintain the jumps in speed the industry has grown to take for granted. AMD is safe in the short term, but it needs to take a serious look at production techniques if the company is to reach a 45nm manufacturing process.

Limited information about the future of AMD's chips can be found on AMD's Web site ([www.amd.com](http://www.amd.com)).

## RIISING SUN

Sun launched its UltraSPARC IV processor early in 2004 on a 130nm process, but a dual-core



► **Pocket rocket:** AMD's 64-bit Athlon chip extends the x86-64 architecture to portables.

version (previously codenamed Jaguar) will be released later this year. Constructed on a 90nm process, Jaguar remains pin-compatible with UltraSPARC III processors. Essentially the UltraSPARC IV puts two UltraSPARC III processors on a single chip, so performance is approximately double that of existing UltraSPARC IIIs.

Although Sun's CEO Scott McNeely has often said that his company would only ship Sun hardware, times are changing. Sun is looking at making a line of Opteron-based servers available in 2004. This is a shrewd move on their part, as it's now free to build up the Opterons (which are already enjoying strong sales from other vendors), providing some income to keep plugging away on the UltraSPARC V processor, which will be launched sometime towards the end of 2005.

The UltraSPARC V processor is expected to launch at 1.8GHz and ramp up to 3.0GHz, while the UltraSPARC IV tops out at around 2GHz. The UltraSPARC V can operate in two different modes, depending on what the processor is being used for. One mode is optimised for performing complex calculations while the other is more suited to moving large amounts of data around, as is required when working with databases.

The V is set to be the last chip designed for SMPs, with the company currently researching multicore processors more deeply. "When you get to 4, 8, or 16 processors on a chip; then you start to see a system on a chip where the performance is really outstanding," says Greg Papadopoulos, executive vice president and chief technology officer at Sun.

## SERVE AND VOLLEY

IBM is in a similar position to Sun, but is already shipping Opteron systems when the launch of its 130nm PowerS systems is imminent. The PowerS processor facilitates massive systems. Each multiprocessor module (MCM) features 16 virtual cores and 144MB of Level 3 cache. Four chips can be connected to the MCM, each with 36MB of Level 3 cache. What's more, MCMs can also be connected to provide 128-way multiprocessing over a 4GB/s bus. IBM is also considering the release of a single core version at launch, and the PowerS will later be relaunched on a 90nm process as the PowerS+.

Unfortunately IBM has had trouble getting its PowerS systems up to speed, so, like Sun, the company has made the decision to push the AMD-based machines. IBM is aggressively targeting the server market and has announced a PowerPC 970 Blade server to compete with Pentium 4 and low-end Itanium systems. PowerPC 970 chips have been shown to scale well, and a massive cluster recently earned third spot on the top 500 supercomputer list. The diminutive unit goes on sale later this year.

Further down the track, IBM is looking to launch the Power6 around 2007, which will be built on a 65nm process. IBM claims the chip will feature "very large frequency enhancements", suggesting it can run at a higher clock speed than most of its competitors. This could herald significant performance gains, provided IBM can maintain the current level of performance per clock cycle.

## CHIP OFF THE OLD BLOCK

Although it was once the largest processor manufacturer in the world, VIA suffered poor sales throughout most of the 1990s. A series of highly successful chipsets in the latter part of the decade and early

part of the 21st century has since served to turn that trend around again and the Taiwanese manufacturer is now looking stable.

VIA is a massive company with interests in both chipsets and motherboards, although the processors traditionally haven't been groundbreaking from a technological standpoint and this doesn't look set to change. VIA has announced a 90nm processor core, codenamed Esther, that will operate at speeds exceeding 2GHz with approximately the same thermal output as existing low-power designs. VIA recently contracted IBM to produce the processors, which are expected to be released in late in 2004 or early 2005. Esther won't replace current designs, and Taiwan Semiconductor Manufacturing Corporation will continue to produce existing processors, networking, multimedia and communications hardware.

VIA has secured licenses to develop chipset solutions for upcoming Intel and AMD platforms and will be slowly adding support for PCI Express, DDR2 RAM, and Serial ATA 2. As yet, there have been no announcements of a successor to VIA's CSP mobile processor that was launched in October of 2003.

#### META DATA

Some of the most interesting processor developments are coming from tiny upstart, Transmeta. Although sales of the company's flagship Crusoe mobile processor were abysmal, thanks to below-average performance, Transmeta hopes turn things around with the Efficeon — the Crusoe's successor that was launched in October 2003.

The make-or-break Efficeon was in development for four years before it finally saw the light of day and Transmeta claims it has fixed many of the problems that existed on the previous chip. The engine width has doubled from 128-bits to 256 and can issue up to eight instructions per clock cycle. The chips are compatible with SSE and SSE2 instruction sets, clock between 1.0 and 1.3GHz and draw between 5W and 14W.

The processors are currently manufactured on a 130nm process by Taiwan Semiconductor Manufacturing Corporation, but plans are afoot to shift production to a 90nm process in one of Fujitsu's plants later in 2004. The upcoming Efficeon processors are claimed to draw around 5W of current (about a fifth of the Pentium M), and run at a clock speed of up to 2GHz. Transmeta even claims that the processor will meet the performance of Pentium M systems but at a fraction of the cost. Only time will tell whether or not these grandiose claims are hype, but if they are correct, Intel and AMD could really have a fight on their hands in the massive mobile market.

The only problem is finding a vendor to use them. Sharp and Fujitsu have announced that they'll upgrade their existing Crusoe systems to Efficeon, but thus far no other OEMs have jumped on the bandwagon. Efficeon will be hanging around until at least 2006, but Transmeta is staying unusually quiet about what — if anything — will follow it. The company has to make it through the short-term before it can afford to plan too far ahead.

#### A CHIP IN THE HAND ...

It's impossible to ignore the size and importance of the handheld and mobile music player markets. Companies such as Motorola have traditionally produced chips for low-power mobile



► **Home grown:** AMD's facility in Dresden produces most of the company's chips.

applications, but Intel now has a significant and dominant investment in the massive mobile phone market. Intel's XScale processors have seen almost wholesale adoption, enabling them to edge out all comers in recent years. Sony, Palm, Toshiba, HP, Dell, Fujitsu, Sharp and Acer all employ Intel's XScale processors in handhelds, while Hitachi, Mitac, O2, Samsung and even Motorola rely on them for mobile handsets.

Motorola has lost ground in the handheld market since Intel made a concerted effort to develop StrongARM chips for the Pocket PC platform. Motorola still produces silicon for Palm devices, but Palm OS 5 now supports processors from Texas Instruments, Motorola and Intel, and many of the current-generation Palm devices rely on the XScale engine.

Given Intel's advances in the market, the company looks to be focusing on ramping up the clock speed in XScale processors, bringing the internal frequency from 400MHz up to 1GHz (at least in the short to medium term). Intel's current top dog is the PXA800F, formerly codenamed Manitoba, which operates at 800MHz.

Although Intel looks to be holding the cards, Texas Instruments and Motorola don't look ready to cash in their chips just yet. Motorola's DragonBall MX1 processors are still kicking on in Palm devices and low-power handhelds and although Palm is moving to Intel powerplants, Motorola is focusing on mobile phones and the Symbian OS.

Meanwhile, Texas Instruments has been plugging away on its Open Multimedia Applications Platform (OMAP) processor line. Early in 2003, the company launched the OMAP 1612 processor, which is designed for high-power mobile phones and wireless devices. The recently announced TCS 4105 UMTS chipset and reference design is planned around multimedia applications and includes specific support for video and 3D. The processors will be available around the middle of 2004 and TI plans on scaling up the UMTS architecture over the next couple of years to keep the upgrade demons at bay.

► **Top of the class:** Intel's handheld processors continue to dominate.



## start

Tuesday, May 13  
12:23 PM

My Videos

My Pictures

My Music

My TV

Radio

Play DVD



## I want my MoD

**As PCs take up residence in living rooms, Microsoft hopes Windows Media Center's Movies-on-Demand capabilities will replace DVD and pay TV. David Braue reports.**

Microsoft may dominate the IT world, but the company's efforts to own your lounge room have been spectacularly unimpressive. Its WebTV venture never gained momentum and was never launched in Australia; similarly, the Xbox plays games well but does little else that could be termed computer-like (barring, of course, the Linux port that's been litigated into submission).

Later this year, however, the would-be Colossus of the home entertainment industry will give Australians another go as it brings its Windows Media Center Edition (MCE) desktop PCs into this country after mildly successful debuts in the US, France, Germany, Japan, China, and the UK.

MCE is what you get when Microsoft gives Windows XP a few months in a beauty salon. It's standard XP code underneath, but add a wireless remote control and some new software applications and you've got what Microsoft hopes will be the kind of PC you'll finally want to put in your TV cabinet and plug into your AV amplifier.

#### BUILDING A HOME MEDIA NETWORK

Make no mistake about it: Windows MCE is the Swiss Army knife of media devices. It plays and records music files, plays DVDs and plays and records directly from TV — although this is done using an obscure MPEG-2 rework known as DVR-MS, which is currently supported by few software applications (a full list of MCE's features is available at [www.microsoft.com/windowsxp/mediacenter](http://www.microsoft.com/windowsxp/mediacenter)). It puts a foolproof patina over XP's complexity, providing access to its content through an interface that Microsoft hopes will be easy enough for anybody to get comfortable with.

The company is hoping its work on improving the reliability of Windows XP has paid off — few consumers will be happy with a system they have to reset or upgrade just to play a CD. Here, Microsoft needs to set expectations accordingly: users who get carried away with hotting up their MCE systems could potentially compromise their stability and features, since the PCs will run other Windows apps but incompatible software could potentially pose problems.

That could create a customer support nightmare, the likes of which even Microsoft would struggle to handle. Nonetheless, the company is counting on the too-cool factor to encourage punters to fork out for Media Center Edition PCs. At January's Consumer Electronics Show in Las Vegas, Bill Gates outlined a number of new products the company hopes will make MCE even more relevant for home consumers.

Due to appear in the US in time for Christmas, these products — Alienware, Dell, Gateway, HP, Samsung, Tatum and Wistron are mentioned as the first suppliers — will incorporate technology Microsoft has dubbed the Media Center Extender Kit to let you broadcast content from a MCE PC to other parts of the house.

This will be made possible in several ways. Set-top boxes, being developed as "Bobsleds", connect to the MCE PC using a standard Wi-Fi connection and use Microsoft's RDP (Remote Desktop Protocol) — built into Windows XP but currently unsupported on MCE PCs — to turn the second TV into what is essentially a dumb terminal. The box will project the MCE screen on your TV, then relay signals from your remote control to let you run the show from the second room.

Another technology — known as "Luge" — will build MCE technology directly into televisions and portable media players, including new devices which allow consumers to use Microsoft Portable Media Center technology to take movies, music and photos on the road with them. Microsoft has recruited Creative Labs, Gateway, iRiver International, Samsung, Sanyo and ViewSonic to turn Luge into a reality.

For consumers hesitant to shell out for new equipment just to build an MCE network in their homes, Microsoft is also offering "Xsled" — a software application which is basically an implementation of RDP that will run on the Xbox. Xsled, being marketed as the Xbox Media Center Extender Kit, will allow any Xbox to link up with an MCE PC, then use RDP to display the control screen and the remote control to interact with the host MCE PC.

With these products (visit [www.microsoft.com/windowsxp/mediacenter/evaluation/devices](http://www.microsoft.com/windowsxp/mediacenter/evaluation/devices) for more details), Microsoft is clearly hoping to grow the MCE PC from a novelty into a hub for the distribution of content throughout the home. Bobsled, Luge and Xsled will save customers from the expensive proposition of buying a Media Center Edition PC for every television, instead letting them get at their content from wherever they happen to be.

It sounds good, but will it fly with Australian consumers? We'll find out this September, when local senior manager for strategic retail development John Gillhespy says we can expect Microsoft Australia finally to bring Windows MCE PCs to our shores.

Significantly, the company is not selling Windows XP MCE through its normal distribution channels, and it won't be available as a standalone product like previous versions of Windows. Rather, it will only be available preloaded on computers from select OEMs: so far, 15 companies, including Dell, Gateway, HP, Sony and Toshiba, have signed up to offer systems expected to hover in price around US\$1,000 in the United States, and likely to leave little change from \$2,000 here.

This strategy has several implications. Firstly, Microsoft clearly doesn't want customers to get a negative perception of MCE because it's loading it onto old computers. This is also reflected in the company's approach with Xbox, in which a standard hardware and software configuration has made the device an easier platform for developers to work with than PCs with ever-changing specifications and capabilities.

#### SOMETHING X-TRA?

Although it's little more than a warmed-over version of Windows XP, MCE's emergence in the wake of the Xbox reflects Microsoft's will to build on the street cred that it has gained through the Xbox. This time around, Microsoft wants to push MCE in the lounge room as a media appliance — albeit a very expensive one — that will effectively turn traditional computer giants into AV suppliers.

With that shift in the market, however, comes greater responsibilities to customers. Buyers of consumer electronics expect support in spades, and given the complexity of Windows XP, it's likely consumers will have many questions about the MCE technology. MCE will be a new sort of product for traditional AV retail outlets, which will be called upon to provide front-line support to help customers through the inevitable problems.

The idiot-proof design of MCE runs counter to the likely early market for MCE — technology enthusiasts and videophiles who are willing to shop unquestioningly in the \$1,000+ range. These are the same people, however, who also typically expect high-end performance from their PCs, and they may balk at buying a dedicated media appliance that doesn't work like the fast computer they already know and love.

Microsoft is using sweeteners to show off the MCE PC's capabilities. In January, it joined such companies as Artisan Entertainment, IMAX and the National Geographic Society, to name a few, to launch 16 films



► **Remote entertainment:** a prototype of Windows Media Center Extender device, which enables all digital music, photos, TV, and movies to be played remotely on TVs and monitors around the home.

deliverable to MCE users. Encoded in Windows Media High-Definition Video (WMHDTV) mode, the films purportedly offer six times the resolution of a DVD, although many of the nuances will be lost due to the technical limitations of PC-to-TV encoders, which typically work at a maximum 800 x 600 resolution.

Exclusive content has a poor history of winning over consumers, however — particularly those who already have high-powered systems which do everything MCE does. If Microsoft wanted to lure the enthusiasts, it would sell MCE separately, encourage power users to experiment with its features, and build it into custom-designed systems that are both quiet and attractive enough to become part of the furniture. It's a grief-inducing catch-22, however, that following this strategy would almost certainly introduce the aforementioned support issues and ultimately prove counter-productive.

#### TAKE TWO

This time around, Microsoft clearly needs to give customers something different to encourage them to give MCE a go. MCE 2004 was the first major upgrade after the software's version 1 launch, and it is clear many of Microsoft's hopes and dreams for MCE rest with the tried-and-failed concept of Movies-on-Demand (MoD).

Movies-on-Demand revolves around the idea that you can visit a Web site, or tune your interactive set-top box to a certain channel and request any of dozens of movies to start beaming itself down the wire into your house.

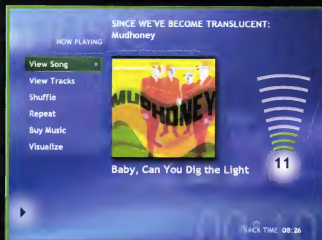
The only problem is, there's no way to get them there. Two-way, digital set-top boxes are still as scarce as hens' teeth in Australia, and the high cost of broadband connections means few people can afford to download the data for an MoD movie. Even worse, the whole concept of MoD is just too complicated for those accustomed to popping a DVD into the player and pushing play.

This is where Microsoft hopes MCE 2004 will make a splash. At the launch of MCE 2004, Microsoft announced partnerships with Internet MoD operators MovieLink and CinemaNow, as well as the reborn Napster, giving MCE customers a direct path to the movies and music they want.





# Feature



► **Multi-function centre:** sure, the Windows Media Center has a lot of functions, but has it got what it takes to replace dedicated home entertainment appliances?

Such partnerships could theoretically make MoD services the saviour of Microsoft's lounge room ambitions. After all, given that few people actually have MoD-capable pay TV boxes, the ability to provide access to MoD services through a new device — the MCE PC — is a natural way of both selling new equipment, and encouraging usage of a convenient service that's hard to get through other means. MCE could become the replacement set-top box that's only now available within Canberra and a few isolated trials in other parts of the country.

There are obstacles, however. MovieLink and CinemaNow are based on the concept of downloading monstrously large files (around 700MB) from the Internet — which is fine for US customers paying flat rates for unlimited broadband usage, but doesn't make sense for Australian consumers who traditionally pay exorbitant fees for high usage. The ongoing shakeout in broadband prices may soften this blow somewhat for many subscribers, but services limiting speed or imposing absurd per-gigabyte charges after a certain limit still threaten the viability of MoD here.

Then there's the looming threat of digital pay TV, which will become a reality this year after Foxtel finally secured the \$550 million in funding it needs to digitise its extensive pay TV network. Digital set-top boxes will give consumers access to around 130 TV channels, including 27 channels reserved for a service called Foxtel Box Office which will provide near-MoD services by staggering big-name movies every 15 to 30 minutes. The service is expected to show 300 movies per day.

Sheer limitations on the numbers of movies available at any given time means Foxtel Box Office is never going to beat MoD services when it comes to choice. However, its menu will be enough for many people who are mainly keen to watch first-run movies. In the future, Foxtel could easily offer real MoD services from a large catalogue in conjunction with content partners, although no specific plans to this effect have yet been announced.

With exactly zero Windows MCE PCs already installed in Australia and hundreds of thousands of Foxtel subscribers — many of whom will be more than willing to fork over what, as of press time, Foxtel was saying would be a minimum of \$48.95 a month for digital service — Microsoft will face an uphill battle convincing consumers that MCE's nascent MoD capabilities are really worth the extra investment.

One valuable feature it could offer is the ability for consumers to use their PCs as repositories for movies they want to watch again and again, although copyright controls — which are easy to implement in a fully digital environment — mean digital pay TV providers are unlikely to emphasise this capability.

Differentiation may come more meaningfully through Microsoft's promotion of its Media Center Edition 2004 Software Development Kit, which the company claims has been downloaded by more than 8,500 developers. By building applications with the SDK, content providers can deliver specific information to MCE users in real time.

Sports network ESPN, for example, is using the technology to let MCE viewers download game highlights, interviews, breaking news and everything else that makes sports lovers' pulses pound. Kodak subsidiary Ofoto is another early adopter, allowing MCE customers to access Ofoto image-processing and sharing services using their lounge room remote. The result could well be like the interactivity of digital pay TV, but extended to pictures and music in a way that digital TV can't yet rival.

**A MATCH MADE IN HEAVEN?**

Better integration with content providers will see interactive video-on-demand extend to all sorts of content other than movies. But will it work with an industry that's already been stung by MoD?

The Redmond giant, after all, isn't the first company to try to make MoD a reality: Video Ezy, for example, partnered with video advertising supplier P.O.S. Media for a joint venture called Ezy+ but axed the venture a year later after P.O.S. Media failed to deliver working broadcast technology. Blockbuster's US parent tentatively trialled the technology in a few US markets but has yet to do anything further.

The only MoD success so far has been Civic Video, whose Video on Demand subsidiary now offers around 300 current-release videos to the 13,000 ACT households lucky enough to be hooked up to the ultra-fast, multi-service TransACT network. Video on Demand is also wiring 6,000 households within multi-dwelling buildings across the Sydney suburb of Homebush Bay, and hoping to partner with Internet service providers able to speed up the service's penetration rate by setting up MoD servers within the Telstra telecommunications exchanges where many ISPs already rent space for ADSL services.

That approach means slow going, however, since it requires separate and painstaking negotiations with each new body corporate. Customers can buy the boxes outright or through finance schemes, but at prices of around \$500 each, you'd really have to loathe the drive to the local video store to justify the expense.

In the long term, MoD providers may find their best bet is to piggyback on the planned — but often-delayed — rollouts of digital pay TV set-top boxes by Foxtel, Optus and other pay TV providers.

Or they might want to explore potential relationships with Microsoft, which will have in MCE a compelling device capable of receiving MoD broadcasts.

If MCE PCs could be linked to a locally-run MoD service that has the backing (and bandwidth cost exemptions) of a major telco and video chain, they could quickly become the saviour of a MoD industry that's simply atrophied from an almost complete lack of interest. Bundled access to MoD would differentiate MCE PCs in the market, making them the must-have item that Microsoft wants to see them become.

There are other issues, of course: DVDs typically include lots of extra content, and consumers will miss that content when renting movies alone via MoD.

"Whereas it was previously competing with [pay TV], now MoD is very much trying to compete with DVD and the experience it gives you," says Video Ezy chief operating officer Peter Scicluna. "MoD or pay-per-view channels need to upgrade the proposition they're offering. MoD definitely has a place in the market, but no one has yet delivered a commercial model that's sustainable."

In its current form, the MCE PC is little more than a novelty. But if Microsoft can find the right combination of features — and MoD seems to be one highly compelling possibility — it could single-handedly revive an anaemic market segment that's so far failed to deliver on its once considerable promise.

Ultimately, the question that will determine MoD's success will be a simple one: can Microsoft and other MoD providers make their services as convenient as a late-night run to the video store? When that's possible, you may never need to pick up a DVD again. **CTC**



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## Sound advice

### Bonus CD software

Audacity 1.2.0-pre2,  
Audition 1, SoundForge 7,  
WaveLab 4 and more.

See page 6 for the full listing.



**There's more to audio software than CD ripping and MP3 files. Daniel Winter separates the signal from the noise.**

Whether you're creating a video soundtrack, composing music or just playing DJ with some MP3 tracks, there's a huge range of audio software at your disposal. While some programs are specialised for particular tasks, others cross all boundaries in the race to become the ultimate audio application. This roundup covers the many different types of audio software available, starting with the more conventional wave editor and sequencer apps, before plunging into plug-ins and rounding off with some of the best digital music utilities on the market.

Most wave editors provide for mono and stereo editing of individual files, but the more advanced programs offer a range of multi-tracking capabilities as well. While programs with this functionality technically belong in the sequencing category, apps like WaveLab and Audition give you the best of both worlds by offering both wave editing and multi-tracking.

With the advent of the DirectX and VST plug-in standards, the use of real time sound effects has become quite common in audio apps. By providing access to these plug-ins, wave editors allow sounds to be manipulated with a range of non-destructive effects such as reverb and echo. In addition to real time effects, most audio editors now provide integrated CD ripping and burning, eliminating the need to use separate programs.



# Audio Software Wave Editors



## Adobe Audition 1

Formerly known as CoolEdit Pro, Adobe Audition is a fully-fledged multi-tracker and wave editor combined. Only its lack of MIDI support prevents it from appearing in the sequencer section, although it's a fine line. Audition supports DirectX plug-in effects and can also handle VST plug-ins with the help of a third-party utility. Audition also has its own set of built-in real time effects, including a range of equalisers, echo delays and dynamics processing. Although its interface is somewhat dated, this program's emphasis is on usability. Common procedures such as zooming, recording, looping and switching between multi-track and edit mode are a breeze.

Unlike some loop-based applications, Audition doesn't provide any real time pitch-shifting and time-stretching features, so any tempo changes to clips require calculation and rendering. To its credit, though, Audition has excellent non real time stretching and loop settings, so any tempo changes made are automatically applied to the affected clips. Another missing feature is clip-based plug-in effects. However, this feature can be emulated by isolating a clip in its own layer with the channel-based effects rack.

**Contact:** Adobe  
**Online:** [www.adobe.com.au](http://www.adobe.com.au)  
**Price:** \$621.50  
**Phone:** 1300 550 305  
**Positives:** Great all-round editing.  
**Negatives:** Big price jump following acquisition by Adobe.  
**Verdict:** ■■■■■



## Steinberg WaveLab 4

One of the most popular editors amongst audio professionals, WaveLab supports a range of powerful features, such as DirectX and VST effects, CD ripping and recording, as well as conventional wave editing. Advanced burning options include mixed mode CD support with an image viewer, while the ripping function supports the unique ability to extract a portion of audio without ripping the entire track.

The audio montage mode is what really sets WaveLab apart from most other editors. This unique approach to multi-tracking provides multiple channels or layers for non-destructive editing in a timeline, without the usual channel settings found in conventional multi-trackers. Instead, all audio options (such as effects) are applied at the clip level. This mode requires a little getting used to — given its unusual combination of mouse and keyboard controls — but once mastered the linear paradigm of the conventional multi-tracker can be hard to go back to.

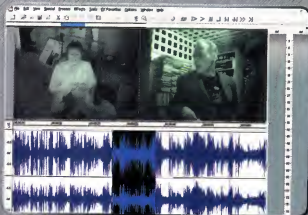
But if you do need the compositional structure of a sequencer, you can export WaveLab montages as multiple wave files for use in audio sequencers such as Cubase and Logic Audio.

**Contact:** Musiclink Australia  
**Online:** [www.musiclink.com.au](http://www.musiclink.com.au)  
**Price:** \$1,199  
**Phone:** (03) 9765 6565  
**Positives:** Versatile and powerful.  
**Negatives:** Steep learning curve.  
**Verdict:** ■■■■■



# Special

## Audio Software Wave Editors



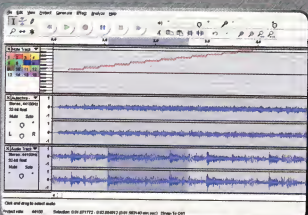
### Sony Sound Forge 7

Sound Forge has always been one of the big guns in the audio editing scene, and the release of the latest version under the Sony brand builds on its already heavy reputation.

CD ripping and burning support is provided, and while the program doesn't offer as many advanced options as WaveLab, it certainly does the job. DirectX effects are natively supported, (and its plug-in organisation is handy for those with a large number of them), but VST plug-ins are still incompatible.

Automatic region detection and cross-fade looping tools are included, as well as a nice clipping detection tool. Hardware sampler support is also available for musicians working with SCSI- or SMIDI-compliant equipment.

In addition to the usual audio editing tasks, such as trimming, normalisation and re-sampling, Sound Forge also includes the ability to edit ACID loop properties and support video soundtrack editing while retaining the video file format.



### Audacity 1.2.0-pre3

Audacity is an open source freeware editor that should keep musicians and editors happy, and the bigger players on their toes. For most wave editing tasks, this application is all you need — it supports CD ripping, MP3 encoding and even some basic multi-tracking capabilities.

The biggest difference between Audacity 1.2.0-pre2 and 1.2.0-pre3 is the addition of a VST enabler, which adds limited support for five VST plug-ins.

The latest beta release fixes many of the bugs present in pre2. An intuitive user interface makes this application quite comfortable to use, allowing for the easy selection of inputs through its main window, bypassing the clumsy Windows mixer altogether.

While MIDI tracks are displayed alongside other files, support for their playback, recording or editing is not yet part of the package. Another seemingly dormant feature is the Beat Finder plug-in found under the Analyze menu.

**Source:** New Magic  
**Online:** [www.newmagic.com.au](http://www.newmagic.com.au)  
**Price:** \$669  
**Phone:** (02) 9528 4555  
**Positives:** Supports video files.  
**Negatives:** No VST compatibility.  
**Verdict:** ■■■■■

**Source:** Audacity  
**Online:** <http://audacity.sourceforge.net>  
**Price:** Free  
**Positives:** Intuitive interface.  
**Negatives:** Advanced features not yet available.  
**Verdict:** ■■■■■





## Audio Software Sequencers



### Steinberg Cubase SX 2.01

Supporting most major plug-in and driver standards and an almost unlimited number of audio and MIDI channels, Cubase SX is a serious contender for professional studio musicians or engineers.

This program lacks DXi support, although very few virtual instruments are only available in this format and come bundled with a VSTi version. ReWire support means this application can be tempo-locked to other ReWire-compliant hosts such as ReBirth, Reason, Ableton Live and FL Studio.

Full automation of all knobs, sliders and controllers is also provided, giving incredibly detailed control over compositions. Sophisticated onboard effects such as EQ, compression, reverb, gating and delay are all available at the channel level as well as through effects buses.

While some programs attempt to copy the way a music studio looks, Cubase SX successfully emulates the way it actually operates.



### FL Studio Fruityloops Ed.

FL Studio has come a long way since its humble beginnings as a drum pattern sequencer. The current version supports VST, DirectX and Buzz effect plug-ins, as well as its own native FL Studio format. Support for both DXi and VSTi instruments is also included.

But the fun doesn't end there, as a fully-functional ReWire client is now available in beta. Besides supporting all known plug-in formats, MIDI and audio sequencing can be performed via a simple drum machine-style pattern sequencer, or in a polyphonic piano roll.

Musicians who've experienced frustrating delays when trying to get an idea down quickly will appreciate FL Studio immensely. Song elements can be knocked out speedily in the pattern sequencer and then elaborated by using the "send to piano roll" function. This app is the next best thing to a professional recording studio. With lifetime free upgrades, it's hard to say no to this little gem.

**Contact:** Musiclink Australia  
**Online:** [www.musiclink.com.au](http://www.musiclink.com.au)  
**Price:** \$1,599  
**Phone:** (03) 9765 6565  
**Positives:** Awesome virtual studio.  
**Negatives:** Expensive and bloated.  
**Verdict:** ■■■■■

**Contact:** Image-Line  
**Online:** [www.flstudio.com](http://www.flstudio.com)  
**Price:** US\$99  
**Positives:** Clean interface; lean and cheap.  
**Negatives:** Simplistic multi-tracking implementation.  
**Verdict:** ■■■■■

## Audio Software Sequencers



### Ableton Live 3

Ableton Live 3 is a fully-featured real time performance tool aimed squarely at musicians. All you need is a laptop, a selection of audio loops and an optional MIDI keyboard and you're ready to start making music.

The latest iteration proves that third time's the charm, with the addition of envelope support and MIDI clip-triggering that results in an almost perfect real time sequencing instrument.

Live performances can be recorded and edited later, before being rendered out to a wave file if desired. Although designed for live use, a sequencer mode is also available, and is quite comprehensive given the limitations of the program.

While there's no support for virtual instruments or even DirectX plug-ins, the control over audio loops in Ableton Live is almost unprecedented. It does lack the ability to set loop points beyond the sample start points, although this is a fairly specific gripe. This is an excellent example of a real time editing suite, and well worth the investment.

**Contact:** Musiclink Australia

**Online:** [www.musiclink.com.au](http://www.musiclink.com.au)

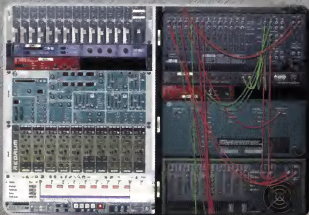
**Price:** \$899

**Phone:** (03) 9765 6552

**Positives:** Robust performance tool.

**Negatives:** No VSTi support.

**Verdict:** ■■■■■



### Propellerhead Reason 2.5

The highly-anticipated update of this popular sequencer really delivers on its promises. The sound quality is top-notch, without the DC offset and dithering problems which plagued earlier releases. Secondly, the new effects are stunning — particularly the digital vocoder. The spider audio unit also provides almost unlimited signal routing between Reason units, expanding it beyond nearly all competing sequencers.

The sequencer window detaches from the main rack window — a godsend for anyone with an SVGA monitor or two. Unfortunately, the single scrolling rack window for all synths, mixers, pattern sequencers and effects is just too frustrating to make complex tracks viable.

Propellerhead claims Reason doesn't support VST and DirectX plug-ins to maintain its stability and robustness. However, other apps achieve such integration without loss of performance.

Overall, Reason is a great all-in-one package which is well priced for its capabilities.

**Contact:** Propellerhead Software

**Online:** [www.propellerheads.se](http://www.propellerheads.se)

**Price:** US\$499

**Positives:** Looks and sounds great.

**Negatives:** Scrolling window interface.

**Verdict:** ■■■■■

# Audio Software Utilities

The delights of music mixing don't stop with applications. Computer musicians are no doubt familiar with the concepts of VST and DirectX plug-ins, but even hardened computer users are often completely unaware of this amazing area of audio technology.

DirectX is a Microsoft technology which provides direct programming access to multimedia hardware, allowing developers to create very low-latency visual and audio applications. Virtual Studio Technology (VST) is a similar technology developed by Steinberg. Originally created for the Cubase sequencer, the VST format has been widely embraced by the audio community. While these two standards are competing formats, there are applications that provide a DirectX interface to VST plug-ins and vice versa. Cakewalk's aptly named VST Adaptor and VST-DX Adaptor from FXpansion are two notable examples. Although, this sort of utility isn't usually necessary as most sequencer and editor applications support both standards.

DirectX and VST come in both effects and instruments plug-ins and are fundamentally different in the way they are used. A VST instrument (VSTi) or DirectX instrument (DXi) can be used to create sounds. Consequently, they usually take the form of "virtual" synthesizers and drum machines. However, VST and DirectX effects are designed to modify existing sounds — distortion, overdrive, delay, reverb, flanging and so on.



► **Frahmage:** warp your audio with wild filter effects.



► **AnalogDelay:** recreate analog tape delay in any VST host.

There are many more audio tools that don't fit into the broader categories of editors, sequencers and plug-ins. For instance, dedicated CD rippers, encoders, players and batch converters all perform specific audio-related tasks. There are even utilities designed to provide simpler control of specific hardware devices. Many hardware samplers used by musicians use proprietary formats that are incompatible with other audio devices. For example, applications such as CDExtract provide read access to CDs formatted for AKAI equipment, not usually accessible from a PC CD-ROM drive. The files on the CD can then be converted to a wide selection of other sample formats, including standard WAV files. In a completely different capacity as an audio utility, SynthEdit provides a visual environment for creating your own VST plug-ins and instruments.



► **Ultraplazer:** create atmospheric spatial effects using multiple LFOs.



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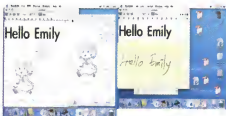
With the cordless pressure sensitive pen, you can adjust line width, colour density or opacity by varying tip pressure. Use it with your favourite graphic softwares such as Paintbrush, Adobe Photoshop/Illustrator, Ulead Photo Express, Corel Draw, Paintshop Pro, etc.



Use the tracing mesh and trace drawings easily and accurately. Ideal for beginners such as students, and children.

#### SKETCHING & ANNOTATION

Use Art Dabbler or Inkwell's InkPad to make a quick drawing or sketchings to your document or email message. Personalise your documents with your signature.



#### HANDWRITING RECOGNITION

Use the graphic tablet as your hand writing input device and convert it to text in Word and Outlook. This feature is easily accessed through MS Office XP. Just activate the "Writing Pad" in Word.



#### WHITE-BOARD ANNOTATION

Integrate tablet with Internet Explorer Netmeeting - white board program and use it as an advance communication tool.

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# WORKSHOP

Hands-on with hardware and software, plus bonus CD content

## 110 Windows 2003 Server

Windows 2003 Server adds a wide range of handy new Management Consoles. *Serdar Yegulalp* demonstrates how to make the most of them.



## 114 Network Shell

Simplify management of your network settings with Windows 2000, XP and 2003's hidden power tool. *Serdar Yegulalp* explains.



## 118 Windows script host, part 3

In the final instalment of our foray into Windows scripting, *Serdar Yegulalp* delves into some of its more powerful features.



## 122 Linux kernel 2.6

The kernel 2.6 for Linux is being heralded as the freshest yet. *Andrew Lou* shows you how to get it up and running in no time.



## 126 Easy Software Products CUPS

With CUPS, you can print from any computer to a Linux or \*NIX print server. *Andrew Lau* directs you to the front of the print queue.



## 128 Photoshop actions

Actions are one of Photoshop's most powerful and versatile components. *Trevor Morris* rounds up over 100 of the hottest freeware actions.



### Bonus CD software

Most Workshop articles are accompanied by bonus software loaded onto our cover CD set — just look for this icon. This is often software that's integral to the article. The selection ranges from full-working versions and trial versions, to shareware and freeware.

APC cannot provide tech support for these programs, but if you have a problem with the CD itself, by all means holler our way (see page 6 for how to contact our CD team).



All code fragments and examples given in Workshop articles are for demonstrative purposes only.

## 130 Ipswitch WS\_FTP Server

If you're managing your own server, FTP is a great way to provide a public repository for files. *Serdar Yegulalp* gets you organised.



## 132 Games server administration

Setting up a games server is the ultimate way to control your gaming environment. *Justin Kronzl* offers some hints to make your server a success.



## 134 Handheld storage cards

Buying a storage card for your handheld? *Jenneth Orontio* gives you the lowdown on making the most of your new investment.



## 136 TechSmith Camtasia 2.2

Take the pain out of PC support by creating your own "walk-through" tutorials with Camtasia 2.2. *John Dolziel* demonstrates.



## Site of the month

<http://channels.lockergnome.com/news>

Lockergnome is part of the overarching Gnome Network, which includes a massive range of sites. The tech news site is maintained by a group of passionate geeks who don't take the project too seriously. For example, the blurb for an Apple forum reads, "Is 9 divine? Is X zen? It's your Jobs to keep the iBoard from going stale". It's not limited to forums, though. Various tech news channels can be found, along with job listings, online auctions and even a geek personals page. One of its best features is the regular RSS feeds, so if you've jumped on the RSS bandwagon, you'll be well fed with tech news and opinion. It's US-based, but there are a huge number of users and posts originating from outside the States.





# Workshop

## Console yourself

Windows 2003 Server adds a wide range of handy new Management Consoles. *Serdar Yegulalp* demonstrates how to make the most of them.

One of the major changes Microsoft trumpeted when it launched Windows 2003 Server was how much easier it was to manage everything. It wasn't all hype, either. New management features, available through the Windows 2003 Manage Your Server (MYS) console and a plethora of new Microsoft Management Console (MMC) snap-ins, really do make it easier to get your hands on many parts of Windows Server. It's time to take a look at the new consoles, what they do and where to find them.

### MANAGE YOUR SERVER CONSOLE

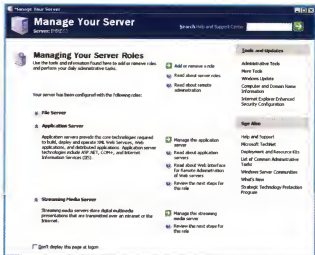
Windows 2003 administrators should be at least passingly familiar with the Manage Your Server console. While not an MMC-style console, it performs as many duties, if not more. Its purpose is to provide a central launchpad for many common administrative tasks, especially what Microsoft now calls "server roles". It appears when Windows 2003 is first installed and appears after every boot and logon, unless the administrator checks the "Don't display this page at logon" box.

Most of the functions integrated into MYS were previously located in the Add/Remove Windows Components section of Add/Remove Programs, or scattered elsewhere throughout Windows. The MYS console brings together the most commonly used and needed functions and provides a wizard-style front end for setting them up. It's also an easy way to tell if a given set of services is installed, without digging through a maze of MMC consoles or wasting time looking for installed components.

Note that the original control panels for these functions remain where they are. For instance, when setting up disk quotas for a file server role, these can still be managed through the Quota tab in the Properties pane for a given drive. They haven't been moved here, just echoed. When launched, Manage Your Server lists existing roles (which can be selected and further managed), and allows you to add new ones via the "Add or remove a role" link.

Setting up the File Server role automatically activates disk quotas for the NTFS system volume (other volumes have to be dealt with manually), and sets up default disk quotas for the system volume for any new users. It also prompts the administrator to enable the Indexing Service — one of Windows' least-used services — which indexes text content on the system to allow fast searches within documents. (If this isn't something you're likely to be doing, leave this off: the indexing service uses a fair amount of overhead, even on a fast computer.) Setting up the File Server role also launches the Share a Folder Wizard.

Once Windows 2003 Server has a local printer added and shared, the Print Server role is enabled. Simply adding a printer driver won't



**Role-playing:** the Manage Your Server console features direct links to MMC consoles for many common server "roles", and lets the administrator add or remove them as needed.

always enable this role — if you add a printer to the server that is a share on a remote machine, the server isn't actually acting as a print server. Only after you add a local printer and share it out does this role change.

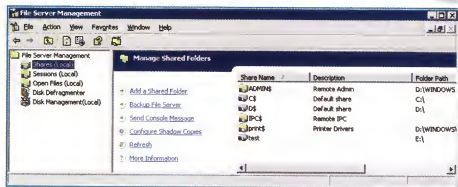
The Application Server is the general umbrella for adding the ASP.NET framework, IIS (Web and NNTP services), COM+ and for enabling FrontPage Server Extensions with IIS. When the Application Server is run, the administrator has the option of adding FrontPage Server Extensions and ASP.NET, but everything else, including the Microsoft Distributed Transaction Coordinator, is installed automatically.

Two things are worth noting here. The first is that if you already have a version of DTC running — for instance, if you've installed SQL Server, which also includes DTC — it will only be overwritten or upgraded if you have a lesser version of DTC installed. Secondly, if FrontPage Server Extensions are installed, the Microsoft SharePoint Administration site will also be added automatically.

The Mail Server adds a POP3 (but not SMTP) server to the system; to add SMTP you'll need to install the Application Server. When set up, the Configure Your Server wizard asks for one of two authentication methods for POP3 accounts — local Windows accounts, the most common variety, or an encrypted password file if you don't want to bother linking POP3 accounts to Windows user accounts. You'll also need to provide an email domain name.

The purpose of adding the Terminal Server role is specifically to allow programs to be run remotely through Terminal Services. The program itself executes on the server, while the program's interface is presented on the client. This doesn't need to be installed if you are

**Up to the task:** Windows 2003 MMC applications now often have task-oriented views, such as the File Server MMC.



simply using Remote Desktop to administer the server remotely.

Selecting Remote access/VPN server launches the Routing and Remote Access Server Setup Wizard, from which the administrator can elect to create remote access connections of various kinds: VPNs, secured connections between private networks, network address translation schemes, and so on.

The WINS Server/DNS Server/DHCP Server/Domain Controller/Active Directory merely kick off the wizards which install the servers in question; they are almost all identical to their Windows 2000 counterparts. Streaming Media Server launches the wizard to install Windows Media Services. This is new as a built-in component for Windows 2003.

When Add or remove a role is launched, one of the options available when choosing a role to add is View the Configure Your Server log. If something has gone awry during an attempt to add a new role, the log will provide detailed feedback about what may have gone wrong.

Outside of MYS, there is also a plethora of new MMC snap-ins. To see them for yourself, launch a blank MMC console by typing `mmc` from the Start/Run dialog, select File > Add/Remove Snap-In > Add, and then double-click on the snap-ins listed to add them into the blank MMC window.

## FILE SERVER

The File Server Management snap-in is only available after adding the File Server role in MYS, and includes both some older snap-ins, such as Disk Defragmenter and Local Disk Management, and some new management features for local shares, sessions, and open files.

Several new tasks are under Local Shares: Clicking on Add a Shared Folder brings up the Share a Folder Wizard; Backup File Server launches the NTBACKUP utility; and Send Console Message performs a Messenger broadcast — although if you have the Messenger service disabled, this is almost worthless.

By far the most important and useful new function here is Configure Shadow Copies, which lets you control the Shadow Copy function for all NTFS volumes on the server.

Shadow Copy preserves versions of folders as they existed at previous points in time, which allows an administrator to roll back files, folders or whole volumes that may have been damaged or had files mistakenly deleted or modified. Note that Shadow Copying is not enabled by default; select a drive and click Enable to turn it on, and then click Settings to modify the default amount of space reserved for shadow copy backups. (The default is 100MB, which is the minimum for using Shadow Copy.)

The Sessions and Open Files snap-ins let you see all open connections and currently active file shares; they can be manually disconnected by selecting and clicking Close Session.

Alternatively, you can click Disconnect All Sessions/Open Files to disconnect them all at once.

## .NET CONFIGURATION

The .NET Configuration snap-in, which works on a computer-by-computer basis, permits you to control several of the most important aspects of a .NET installation. But be warned: unless you're familiar with .NET programs and their construction, don't mess arbitrarily with anything in here.

The assembly cache contains all assemblies used in the current .NET installation. From here the administrator can add assemblies (available as DLL or EXE packages) or simply view the existing assembly list. Assemblies are listed by name, internal revision number, locale and public key token.

Configured assemblies lists all the assemblies in the assembly cache that have an associated binding policy or codebase. Assemblies of older revisions can be "mapped" to newer ones here using the Binding Policy tab under the assembly's Properties (always older to newer, never the other way around).

Remoting services are for using specific communication channels (channels being a .NET function) and endpoints for remote objects, such as applications running on other .NET servers. Unless you're creating apps that operate across servers, this doesn't need to be touched.

Runtime Security Policy controls the access various assemblies have to protected system resources, which is done by granting or revoking trusts. Several wizards can be launched from here:

**Trust An Assembly:** increases the level of trust for a particular assembly based on information gathered automatically about it.

## So what's missing?

*Despite a lot of obvious and very welcome reorganisation, there are still a few things that aren't available through Manage Your Server, or which still exist as a conventional MMC requiring a lot of digging to get to, or both. One of the biggest is the Group Policy console (GPEDIT.MSC) for the Local Computer.*

*Since not everyone uses Active Directory to propagate policies, access to it could have been made easier. Similarly, first-party external server applications such as SQL Server 2000 don't appear in the Server Roles console, but must still be accessed through their own Program Menu shortcuts. Making them available in MYS as well would be both useful and make for even tighter integration between Windows 2003 Server and its host products.*

**Bonnets up:** most of the options in the .NET Configuration console allow for extremely detailed governance of the security and behaviour of .NET apps.

**Reset All Policy Levels:** deletes all existing policies and returns them to the default settings (obviously, you only want to use this one if things get out of hand).

**Adjust Zone Security:** changes the level of trust for a particular network zone.

**Evaluate Assembly:** determines what permissions should be given to a particular assembly.

**Create Deployment Package:** packages a security policy level as an MSI file for deployment across a network.

Within Runtime Security Policy are three policy levels: Enterprise, Machine and User, each describing the scope that a particular assembly can run in. (An assembly with the scope User would only affect the current user, for instance). Each policy level contains three other hierarchies: Code Groups, Permission Sets and Policy Assemblies, which further describe how code can run in that particular policy level.

## IIS MANAGER

Thanks to the re-architecting of IIS and the addition of .NET, new items are present in each entry for the IIS Manager snap-in in the forms of Application Pools and Web Service Extensions.

Application Pools lists all the app pools available to IIS, and the user can add new ones as needed by right-clicking on Application Pools and selecting New > Application Pool.

Web Service Extensions lists all the available extensions to IIS — ISAPI and CGI extensions, ASP and ASP.NET, WebDAV and so on — and their execute permissions on the current server. And as before, any SMTP and NNTP virtual servers installed under IIS will be listed here as well.

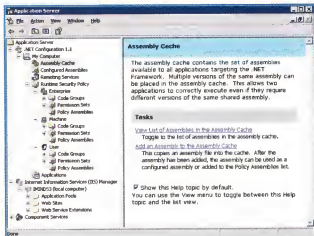
## POP3 SERVICE

Another new service to Windows 2003 Server is a minimal POP3 mailbox server. The tree in the left-hand pane lists all POP3 servers by domain and server. Mailboxes aren't added automatically for new users, although when you click on Add Mailbox in the POP3 Service console, you can elect to have a new local user account created for that mailbox.

Right-click on the computer name in the left-hand pane and select Properties to choose the server port, logging level (that is, how verbose the logging for POP3 actions is — the default is Minimum), the mail directory and a few other associated functions.

## ACTIVE DIRECTORY: SAVED QUERIES

This is a new element in existing Active Directory snap-ins which allows commonly-used query definitions to be saved to a file, imported, installed here and then re-used as needed. If you're not using a third-party query tool, or are constantly typing the same AD queries over and over again, this is a huge bonus.



## WINDOWS MEDIA SERVICES

This snap-in only becomes available if Windows Media Services is installed, but from here you can install Streaming Media servers (they need to be installed by IP address) and manage their configuration. Three sub-consoles exist here for each installed server: troubleshooting (an interactive event log), cache/proxy management (for performing cache-on-demand for streams and proxy broadcasting) and publishing points (for creating new broadcasts or editing existing ones).

Selecting the icon for the server itself lets you control server-wide behaviour like plug-in properties or inserting third-party advertising. Also included are quick-launch links for many common broadcasting scenarios, such as streaming a live broadcast.

## WIRELESS MONITOR

Since Windows 2003 Server supports wireless access directly, it only makes sense to include an MMC console for wireless connections. Each computer listed in Wireless Monitor has two categories: access point information (for access points, if any, that the system is connecting to), and wireless client information (for any peer-to-peer connections with other wireless adaptors). No management is possible from here; the console only displays information such as radio channel frequency, privacy settings, signal strength and MAC address for each connection.

## REMOTE DESKTOPS

Along with the Remote Desktop client, there's an MMC implementation of Remote Desktops. The administrator can add as many connections to other remote machines as needed here. These can be any machine running Remote Desktop or Terminal Services — Windows 2000, Windows XP Home or Professional, or Windows 2003 Server.

To add a new connection, right-click on the Remote Desktops icon in the left-hand panel and select Add New Connection. Connections appear as icons in the tree. Simply click on an icon to open a connection, or right-click on it and hit Disconnect to finish. If you don't choose to supply a username and password for each connection when it's created, you'll be prompted for one at connection time. Thus, it obviously makes a lot of sense — and saves a lot of time — adding the username and password when you create the connection. **ETC**

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Netsh's little brother: sample output from `ipconfig /all`. Each adaptor's IP and physical address, as well as DHCP and DNS information (if any) is presented.

```

C:\Documents and Settings\user>ipconfig /all

Windows IP Configuration

Host Name . . . . . : SHULB
Primary Dns Suffix . . . . . : 
Node Type . . . . . : Mixed
IP Routing Enabled . . . . . : No
WINS Proxy Enabled . . . . . : No

Ethernet adapter Whare Network Adapter Wnet01:

Connection-specific DNS Suffix . : 
Description . . . . . : Whare Virtual Ethernet Adapter for VMnet8
Physical Address. . . . . : 00-50-56-00-00-00
Pkg Enabled . . . . . : No
IP Address . . . . . : 192.168.44.1
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 

Ethernet adapter Whare Network Adapter Wnet02:

Connection-specific DNS Suffix . : 
Description . . . . . : Whare Virtual Ethernet Adapter for VMnet1
Physical Address. . . . . : 00-50-56-00-00-01
Pkg Enabled . . . . . : No
IP Address . . . . . : 192.168.17.4
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 

Ethernet adapter Local Area Connection 31:

Connection-specific DNS Suffix . : 
Description . . . . . : Intel(R) PRO/1000 Management Adapter
Physical Address. . . . . : 80-10-27-43-3B-06
Pkg Enabled . . . . . : Yes
IP Address . . . . . : 192.168.0.2
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1
DHCP Enabled . . . . . : Yes
DHCP Client . . . . . : 192.168.0.2
DHCP Server . . . . . : 192.168.0.1
Lease Obtained . . . . . : Sunday, January 04, 2004 12:39:10 PM
Lease Expires . . . . . : Wednesday, January 07, 2004 12:39:10 PM

C:\Documents and Settings\user>

```

speak to each other (wireless 802.11b and Ethernet). It can't be used to create bridges, however, only to audit their state. Creating bridges can only be done manually through Network Connections.

The `diag` command (Windows XP and Windows 2003 only) dumps diagnostic information about the network on the current machine. `Diag show all` (or just `show all` if you're already in `diag`) prints a quick summary of the current network configurations, including Internet Explorer/Outlook Express-specific information, such as Web proxies, mail/news servers, loopback addresses, network adaptor names and network clients. It doesn't print IP-specific configuration, however; for that, use `int ip show ?` to list all possible information for the IP stack.

## TAKING COMMAND

If you are experiencing problems browsing the Web, they may relate to your DNS server. To diagnose, type `netsh diag ping dns`. This pings each DNS server for each network interface in turn and produces a detailed report. If your system is having trouble getting an IP address from its DHCP server, use the command `netsh diag ping dhcp`.

Typing `diag gui` opens the under-used Network Diagnostics pane in the Help and Support Center in Windows XP and 2003. From there you can perform graphical tests of the local network settings if you're not comfortable working with a command line.

**Interface** sets and displays information about the network interfaces available. This command can be abbreviated as `int` and contains three contexts of its own: `ip`, `ipv6` and `portproxy`. The first two configure TCP/IP and IPv6 controls; the third controls proxying between TCP/IP and IPv6 networks. The most commonly used is `ip`. The command `ipsec` (Windows 2003 only) edits and displays IPSEC (IP Security) settings for both dynamic and static addresses.

**Ras** controls options for Remote Access, including diagnostics. This is especially useful for servers that use Remote Access links or multilink connections. Subcontexts within `ras` include `aaaa` (authentication, authorisation, accounting and auditing — for confirming user identities), `appletalk` (for editing Appletalk-protocol remote connections), and `ip` and `ipx`. From here the user can set authentication types (PAP, SPAP, MD5CHAP, MSCHAP, MSCHAPv2 and EAP), link and multilink properties (SWC for software compression or LCP for Link Control Protocol extensions), and registered server information. Note that unless RRA is running, many commands in the `ras` context will return an error.

**Routing** is used for administering the routing functions of a server using Routing and Remote Access. From here, proxies and routers can be added or removed (`install/uninstall`), along with interfaces and global parameters for same. NAT, RIP and DHCP controls can all be set from here as well. Also, as with `ras`, unless RRA is running, few things in the `routing` context will work correctly.

Using `rpc` (Windows 2003 only), you can make changes to the system's Remote Procedure Call interfaces and settings. The `wins` (Windows 2003 only) command makes changes to the WINS settings. Microsoft has published a full list of netsh commands and

contexts online at [www.microsoft.com/technet/prodtechnol/windowsserver2003/proddocs/standard/netsh\\_topnode.asp](http://www.microsoft.com/technet/prodtechnol/windowsserver2003/proddocs/standard/netsh_topnode.asp). Keep in mind that netsh for Windows 2003 contains more commands than other versions of netsh, so not everything you see there will be available in other operating systems.

## IPCONFIG

If netsh is too complicated for your needs, and you just need a simple utility for changing IP configuration settings, consider the command-line tool `ipconfig`. It only does a few things, and only with TCP/IP, but they tend to be among the most common maintenance actions for a network adaptor. It's not internally scriptable, so any scripting will have to be in the context of a batch file. The command set is small and is done entirely with command-line switches.

The `/all` command dumps out all the IP configuration information for each network adaptor in the system, including physical address, subnet data, gateways, DHCP and DNS servers, and lease information (for connections configured with DHCP).

Typing `/release` releases any DHCP-configured IP address information for a specified adaptor. The adaptor needs to be specified by name; use `ipconfig /all` to see adaptor names. You can also use a wildcard (`ipconfig /release *`) to release all adaptors, or to refer to specific ones via shorthand (`ipconfig /release Intel*` would release any adaptors with Intel at the beginning of the name).

Use `/renew` to renew IP address information for a given adaptor (wildcards are also okay here). Note that `/release` and `/renew` only work on DHCP-configured adaptors.

To erase the DNS cache, use the command `/flushdns`. Useful if you have stale DNS entries which are making it impossible to reach certain sites without using an IP address instead of a domain name.

The command `/registerdns` refreshes all DHCP leases and re-registers all network interfaces with the local DNS server.

The contents of the DNS cache is dumped using the command `/displaydns`. This can be a very long printout, so it's best directed to a file (`ipconfig /displaydns > dns.txt`). For each network adaptor, `/showclassid` / `/setclassid` displays and modifies DHCP class IDs. [CITE](#)



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# A script for success, part 3

In the final instalment of our foray into Windows Scripting, *Serdar Yegulalp* delves into some of its more powerful features.

A lot of information crucial to Windows is now stored in the registry rather than files. Getting into the registry programmatically and making changes can solve many problems. Scripting registry changes is a convenient way to automatically apply modifications, or to alter them interactively.

Three WScript methods are used to access and change the registry: `RegRead`, `RegWrite` and `RegDelete`. All three work through a `WScript.Shell` object as follows:

```
Set WshShell=WScript.CreateObject("WScript.Shell")
strRegValue=WshShell.RegRead("HKEY_CURRENT_USER\identities\
Default User ID")
```

This reads the value of the default user ID, as stored in the registry key `HKEY_CURRENT_USER\identities\Default User ID`, into the variable `strRegValue`. Since the data could be one of many types, the variable is a Variant and can hold many types of data — binary, string, or integer. `RegWrite`, however, works a little differently:

```
Set WshShell=WScript.CreateObject("WScript.Shell")
WshShell.RegWrite "HKCU\Bogus\intValue", 108, "REG_DWORD"
WshShell.RegWrite "HKCU\Bogus\StringValue", "This is a test value",
"REG_SZ"
```

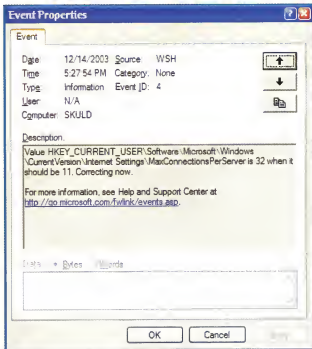
`RegWrite` works by having the user pass three parameters: the location of the key to write, the value itself, and the data type for the key, which can be `REG_SZ`, `REG_EXPAND_SZ`, `REG_DWORD` or `REG_BINARY`. The one value that can't be written is `REG_MULTI_SZ`, or the multi-string value.

`RegDelete` can work in two ways: to delete only a specific key, or to delete an entire subkey automatically (along with its contents). The way to distinguish between the two is with syntax. If the name of the key you pass to `RegDelete` has a trailing slash (/), the entire key is deleted. If not, only the specified value (if it exists) is deleted.

```
Set WshShell=WScript.CreateObject("WScript.Shell")
WshShell.RegDelete "HKCU\Bogus\intValue"
WshShell.RegDelete "HKCU\Bogus"
```

In the above example, the first `RegDelete` removes the `intValue` value from `HKCU\Bogus\`. The second deletes the entire `HKCU\Bogus` key and everything under it. (`HKEY_CURRENT_USER` can be abbreviated as `HKCU` and `HKLM` for `HKEY_LOCAL_MACHINE`.)

The following script goes through a list of registry entries in a text file, compares those values with their actual values, updates them if



► **Logged in:** a Windows Application Log entry created by a Windows Script. Note the "Source:" entry is WSH for Windows Script Host.

necessary and notifies the user of the changes. This is useful if you want to enforce certain registry entries and have programs which change them on you. Never make changes to the registry you aren't sure of. Editing the wrong thing or deleting the wrong subkey can wreck your system for good. Ensure all spelling is correct.

On Error Resume Next

```
Set WshShell=WScript.CreateObject("WScript.Shell")
strFileName="registry.txt"
Set objFS=CreateObject("Scripting.FileSystemObject")
Set objFile=objFS.OpenTextFile(strFileName,1,0)
While Not objFile.AtEndOfStream
    strInput=objFile.ReadLine
    intTabPos=InStr(strInput,chr(9))
    intTabPos2=InStr(intTabPos+1,strInput,chr(9))
    strKey=Left(strInput,intTabPos-1)
    strValue=CStr(Mid(strInput,intTabPos+1,(intTabPos2-intTabPos)-1))
    strKeyType=Right(strInput,len(strInput)-intTabPos2)
    strRegKey=CStr(WshShell.RegRead(strKey))
    If strRegKey="" Then
        MsgBox "Key " & strKey & " does not exist in the Registry. Creating it."
        WshShell.RegWrite strKey, strValue, strKeyType
    Else
```



```

If strRegKey<>strValue Then
    MsgBox "Value " & strKey & " is " & strRegKey & " when it should
be " & strValue & ". Correcting now."
    WshShell.RegWrite strKey, strValue, strKeyType
End If
End If
Wend
Set objFile=Nothing

```

The CStr function converts variables from one type to another. Variable comparisons in VBScript must be of the same type. An Integer variable set to 10 is not equal to a String set to 10. To evaluate the variables strRegKey and strValue correctly, they both need to be converted to String values. The CStr function does this when the two variables are assigned, saving us a step. It would also be valid to say:

```

strValue=Mid(strInput,intTabPos+1,(intTabPos2-intTabPos)-1)
strValue=CStr(strValue)

```

This doesn't change the program's logic — it's only for the sake of readability by the programmer.

Before running this script, create a file named registry.txt and place it in the same directory as the script. The registry.txt file contains the registry entries to be scanned, followed by the value to change it to and the type of key to use, each separated by tabs.

```

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\
Internet Settings\MaxConnectionsPerServer [TAB] 10 [TAB] REG_
DWORD

```

This updates the MaxConnectionsPerServer key to 10. This change shouldn't have any adverse effect on a system. The key controls the number of HTTP connections the computer can make to a Web server, which may speed the loading of complex Web pages.

To get rid of dialog boxes, use the Windows Application Event Log, a repository in Windows NT/2000/XP into which the OS or Windows apps can write events or notifications that can be referenced later. (In Windows 98/Me, log events are written to a file named WSH.LOG in the \Windows directory.)

Here's a version of the above script that runs silently and logs all its output to the system event log. It also deletes entries — to do this, place a dash in front of the key name in the registry.txt file.

```

On Error Resume Next
Set WshShell=WScript.CreateObject("WScript.Shell")
strFileIn="registry.txt"
Set objFS=CreateObject("Scripting.FileSystemObject")
Set objFile=objFS.OpenTextFile(strFileIn,1,0)
While Not objFile.AtEndOfStream
    strInput=objFile.ReadLine

```

```

If Left(strInput,1)="-" Then
    strKey=Mid(strInput,2)
    WshShell.RegDelete strKey
Else
    intTabPos=InStr(strInput,chr(9))
    intTabPos2=InStr(strInput,chr(9))
    strKey=Left(strInput,intTabPos-1)
    strValue=CStr(Mid(strInput,intTabPos+1,(intTabPos2-intTabPos)-1))
    strKeyType=Right(strInput,len(strInput)-intTabPos2)
    strRegKey=CStr(WshShell.RegRead(strKey))
    If strRegKey="" Then
        WshShell.LogEvent 2,"Key " & strKey & " does not exist in the
Registry. Creating it."
        WshShell.RegWrite strKey, strValue, strKeyType
    Else
        If strRegKey<>strValue Then
            WshShell 4,"Value " & strKey & " is " & strRegKey & " when it
should be " & strValue & ". Correcting now."
            WshShell.RegWrite strKey, strValue, strKeyType
        End If
    End If
End If
Wend
Set objFile=Nothing

```

WshShell.LogEvent writes events to the log and takes two parameters. The first is the type of event to log, an Integer. Valid values for the event type are shown in the table on the following page. The exact use of the event type is optional, although it's best to use the type most closely matching the event. Don't use AUDIT\_SUCCESS and AUDIT\_FAILURE since they are often used to report successful/failed security authentication. LogEvent can also take a third parameter, the name of another machine on the local network. In this case, the log event is written to that machine rather than the machine the script is running on. Use the following registry.txt with this script:

```

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\
Internet Settings\MaxConnectionsPerServer [TAB] 10 [TAB] REG_
DWORD
-HKEY_CURRENT_USER\Software\Hitbox\

```

The last line deletes everything under the subkey HKEY\_LOCAL\_MACHINE\Software\Hitbox\ (note the trailing slash); the hyphen before it tells the script that this is a delete action. If you want to use the delete function to delete only a specific value, rather than a whole key, leave off the trailing slash.

#### COMMAND-LINE PARAMETERS AND OTHER USER INPUT

So far, all the scripts explored here have been "hard-wired" — any parameters were in the form of data in an external file. Almost every



program (and many scripts) use external user input, whether in the form of Yes/No dialog boxes or command-line parameters.

In the sample code on this month's cover CD set, the script prompts the user for input whenever there is an action and accepts command-line parameters for changing its behaviour. At the top of the script is a new `WScript` object, `WScript.Arguments`. When set to the object `Args`, `Arguments` produces a list of the different command-line arguments passed to the script. This list is referred to as a "collection" in VB-speak, and collections have properties of their own. Here, the `Args.Count` property returns an integer value telling us how many command-line parameters were passed; if there are more than zero parameters, the script evaluates them.

To evaluate all the objects in a collection, use the VBScript commands `For Each` and `Select Case`. `For Each` lets you iterate through every item in a collection and temporarily assign its value to a variable. `For Each X In Args` means, "Go through each of the values in the collection `Args`, assign each value to the variable `X`, then run all the commands up to the `Next` statement." In this case, the command is the `Select Case` statement, which is bracketed by the `For...` and `Next`.

`Select Case` lets you perform a multiple-choice operation on a variable. `Select Case Left(X,2)` means "Take the leftmost two characters of `X` (one of the values in the `Args` collection) and see if it matches any of these results". Each `Case` statement lists a possible match and commands to execute in the event there is a match. `End Select` tells the script engine there are no more `Cases` to `Select`. (`Case` statements in strings are not case-sensitive, despite the name.)

The first `Case` statement checks for the `-f` parameter, allowing the user to pass a different name for the script other than the default `registry.txt`. Due to the way the script logic is constructed, if no alternate name is specified, the program defaults to the original name. For a script named `alt.txt` the parameter would look like this:

```
-f:alt.txt
```

The `"-s"` case tells the script to run "silently" — that is, do not prompt the user unless they need to make a decision and write all actions to the event log. The `"-z"` case tells the script never to prompt the user for feedback and make all changes anyway. You can pass one parameter independently of another. If you use all three, the command line to run the script would look like this (assuming the script is named `registry.vbs`):

```
registry.vbs -f:alt.txt -s -z
```

The last two `Case` statements set variables which in programming terms are called "flags". A flag is a variable representing an internal

program setting. Here, we use `intSilent` and `intNoFeedback`, each set to 0 at the top, to tell the program whether or not to run silently or prompt the user for feedback. The value for each is tested later on.

`MsgBox` has so far only been used to warn the user of an impending action. But `MsgBox` also works as a function and can return a value based on what the user selects. In this script, the variable `Result` is set to the result of the function `MsgBox`, albeit with one extra parameter at the end describing the type of dialog box to show. The integer value 36 tells the script engine to pop up a "Yes/No" dialog box; if the user clicks "Yes", `MsgBox` returns the value 6. (The script forces the variable `Result` to 6 if `intNoFeedback` is non-zero. This saves a few steps.)

The list of possible `MsgBox` parameters is huge. Visit <http://msdn.microsoft.com/library/default.asp?url=/library/en-us/script56/html/vsfctmsgbox.asp> for a full breakdown.

Here are some ways to use this script as a starting point for more advanced exercises:

- Rewrite the script to use standard REG files (which are also plain text) rather than the tab-delimited format shown previously.
- Have the script write out backup copies of all settings to a file that can be used by the script to restore the old settings in case something goes wrong.
- Add another switch, `-p`, which uses the `InputBox` statement (which obtains text input from the user) to prompt the user for the location to the `registry.txt` file. (`InputBox`'s syntax can be found at <http://msdn.microsoft.com/library/default.asp?url=/library/en-us/script56/html/vsfctinputbox.asp>).
- Have the script rewrite itself and edit its own default settings.

### USING THIRD-PARTY SCRIPTABLE COMPONENTS

Many third-party programmers have created custom programmable ActiveX/COM objects (in the form of DLLs), accessed through Windows Script. These objects allow programmers to do things not covered in the standard batch of objects. The syntax for these is very similar to that of system objects, making them easy to work with.

`AutoItX.DLL` ([www.hiddensoft.com/AutoIt/](http://www.hiddensoft.com/AutoIt/)) is a third-party component package which is similar to the `SendKeys` function, only more powerful. Among the many commands in this library is the ability to write or paste text to or from the clipboard. Once the DLL is installed, part of a script to use it might look like this:

```
Set AutoIt=CreateObject("AutoItX.Control")
AutoIt.ClipPut "Paste this!"
```

The first line is familiar, but the object name is optional. The first half of the object name (before the full stop) is the author of the DLL; the second is the name of the object. The name varies from object to object. Once we create the object `AutoIt` to access all functions in the `AutoItX.Control` library, its properties and methods can be invoked. The `ClipPut` method writes the string to the Clipboard — something `SendKeys` can't do.

However, there's more Windows Script can do in terms of working with third-party components and applications. It's also a good way to get one's programming "legs" before venturing into the world of C++, Java, Visual Basic, C# and the .NET galaxy of languages. [▶▶▶](#)

### WshShell.LogEvent event types

Type	Value
0	SUCCESS
1	ERROR
2	WARNING
4	INFORMATION
8	AUDIT_SUCCESS
16	AUDIT_FAILURE



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# Pop goes the kernel

You can have the freshest Linux kernel up and running in no time. **Andrew Lau** takes you in for a closer look.

After a five month pre-release testing cycle, the kernel 2.6 for Linux was released in December 2003. It heralds significant performance and reliability improvements in a range of computing uses, from embedded to desktop all the way up to data centres.

## WHAT'S NEW?

For the desktop user, the biggest improvements in 2.6 are in interactivity. The kernel is now preemptible, meaning it can be interrupted mid-task a lot more frequently, so other apps can continue to run in the background. Users may notice an improvement in interactive response times with this feature enabled.

Linux now supports HyperThreading, which allows a single CPU to masquerade as multiple virtual CPUs in order to provide finer multi-tasking control. The introduction of Native POSIX Thread Library (NPTL) support allows the kernel to group threads together and allocate local memory for individual threads for applications utilising this library.

A wider range of sound cards is supported now that Open Sound System has been superseded by the Advanced Linux Sound Architecture (ALSA). Users switching to ALSA must install `alsa-lib` and `alsa-utils`, available on this month's cover CD set or from [www.alsa-project.org](http://www.alsa-project.org).

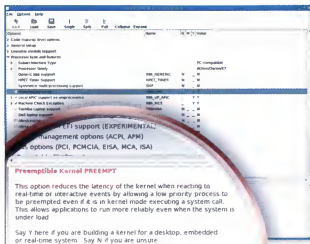
The XFS journaling file system from SGI has finally been ported from Irix and offers a high performance alternative to ext3. Reiser4, the successor to ReiserFS, didn't make it into 2.6 but patches are available at [www.namesys.com](http://www.namesys.com). The replacement for the obsolete DevFS file system interface to device drivers, `udev`, is still a work in progress. `Sysfs` provides a friendlier way to query system device information via the `sysfsutils` tools (<http://linux-diag.sf.net>). To enable it, type: `mkldir /sys` and add `'sysfs /sys sysfs defaults 0 0' to /etc/fstab`.

Laptop users will appreciate the improved ACPI power management, wireless support, suspend to disk and CPU Frequency scaling to save battery power. A comprehensive roundup of every kernel 2.6 subsystem is available at [www.kniggit.net/wwol26.html](http://www.kniggit.net/wwol26.html).

## TASTE THE FLAVOUR

You can download 2.6 from [www.kernel.org](http://www.kernel.org), but the 2.6.1 sources are provided on this month's cover CD set. As the kernel is the most security critical part of any operating system, you may wish to verify its integrity using GnuPG — follow the instructions at [www.kernel.org/signature.html](http://www.kernel.org/signature.html).

Now it's time to decompress the source. The traditional directory to unpack the kernel source is `/usr/src`, but you may need to



► **Decisions, decisions:** the more time you take to customise your settings, the more efficient your kernel becomes.

belong to the `src` group (`# adduser <user> src`, then re-login) or change the ownership on it (`# chown <user> src`) to build without root privileges.

\$ `tar -zxvf ~linux-2.6.1.tar.bz2`

(Use `j` instead of `z` if you have downloaded the `bzip2` (.bz2) compressed tarball.)

Some third party device drivers look for a kernel source under `/usr/src/linux`, so you may want to establish a symlink. Remove or rename any pre-existing symlink or directory of the same name.

\$ `ln -s linux linux-2.6.1/`

## PREPARATION

Before doing anything, back up your important data in case you make a mistake with the boot loader config. A list of recently discovered bugs is kept at [www.kernel.org/pub/linux/kernel/people/akpm/must-fix](http://www.kernel.org/pub/linux/kernel/people/akpm/must-fix).

Depending on how current your Linux install is, you may need to upgrade a few tools. The Documentation/Changes file lists the current minimal requirements of each kernel release. For kernel 2.6, most users only need to install `module-init-tools`, the module handler [www.kernel.org/pub/linux/kernel/people/rusty/modules](http://www.kernel.org/pub/linux/kernel/people/rusty/modules) which replaces `modutils`. As detailed in the README, `module-init-tools` has a slightly different procedure for relocating modutils and generate `/etc/modprobe.conf` for those compiling it from source:



```
$ ./configure --prefix=/
$ make mveold && make
# make install
# ./generate-modprobe.conf /etc/modprobe.conf
# depmod <new-kernel-version>
```

## CONFIGURATION

Linux now has four different ways to configure the compile time options listed below, along with the prerequisite libraries that you need to install beforehand. The first two are text based, while the rest are graphical. All of them write the choices made into a file called `.config`.

- config** Asks about each individual option, one at a time, but lacks navigation means.  
Prerequisites: none.
- menuconfig** Text-based colour menus, radio lists, dialogs.  
Prerequisites: `libncurses-dev (deb)`, `ncurses-devel >= 5.0 (rpm)`
- xconfig** Qt 3 based configuration tool.  
Prerequisites: `libqt3-dev (deb)`, `qt-devel >= 3.0 (rpm)`
- qconfig** Gtk+2.0 based configuration tool.  
Prerequisites: `libgtk2.0-dev (deb)`, `gtk2-devel >= 2.0 (rpm)`

To launch one of the above, run **make** followed by the name of the interface. For example:

```
$ make menuconfig
```

Some kernel features may be built directly into the kernel, while others can be built as modules which can be loaded at runtime. To get a good idea of what you need to enable, the following files and commands (under `/sbin/`) are helpful:

- The `/etc/fstab` file lists all the partitions you have installed as well as all file systems your kernel needs to support.
- The `/boot/.config-VERSION` file contains a copy of the `.config` file used to compile the specific kernel installed on your system. Copy it into the tree if you'd like to use it as a starting point, but be aware that pre-installed configurations are typically bloated.
- `lspci [-v]` lists all PCI devices on your system. Each optional `v` increases the verbosity.
- `lsmod` lists all currently loaded modules.
- `modinfo <module>` displays information on a specified module.

If you are unsure of anything, carefully read the accompanying help and supporting documentation it may direct you to. Here are a few items users new to kernel compilation should be aware of:

**Loadable module support:** as a general rule of the thumb, compile everything as a module for efficiency, with the exception of

anything the kernel needs to bootstrap the system. In order to do so, module automatic loading and unloading module support should be enabled. Note that in 2.6 the filename extension for kernel modules is `*.ko`.

**Processor type and features:** the kernel can be compiled to utilise every feature your processor's instruction set offers. However, stating the wrong CPU can render the entire kernel unusable. Owners of multi-processor systems should turn on Symmetric multi-processing support. The pre-emptible kernel and MTRR options will further enhance performance on desktops.

**Bus options:** apart from PCI support, most users need to enable support for hot-pluggable devices in order for USB and/or PCMCIA devices to be recognised if they are plugged in after bootup.

**Executable file formats:** your OS will come to a halt if ELF support is disabled.

**IDE and SCSI:** compiling the drivers required to access your IDE hard drives directly into the kernel is essential, or the rest of the OS will fail to load. Performance is greatly enhanced if PCI DMA is enabled and the optimisations matching the bus-mastering chipset are turned on. In previous kernels, ATA/PI CD burners used the `ide-scsi` module to emulate a SCSI device for CD writing. In 2.6, the kernel supports direct writing to IDE CD drives. If you don't have any SCSI devices, don't rush to disable SCSI support altogether, as many USB storage devices and cameras emulate a SCSI interface for data transfers.

**Networking:** networking devices and options now share the same section in the menus. Options include TCP/IP and the iptables firewall modules, as well as the essential packet and Unix domain socket support which must be enabled. Don't forget to select your Ethernet card, or PPP for dialup and ADSL users. If you have a wireless card, you must enable Wireless Extensions even if your drivers are separate from the kernel.

**Input device:** turn on support for your keyboard and mice.

**Character devices:** this section contains support for standard serial, parallel printing and virtual terminals (Unix98 PTY) support. For best performance under the XFree86, match the AGP chipset and Direct Rendering Manager settings (for non-Nvidia video cards) to correspond with your hardware.

One crucial thing to note is that the AGP module (`agpart`) has been split into common and chipset-specific modules. To autoload the latter for 3D acceleration, add `alias /dev/agpart-chipset=agp` to `/etc/modprobe.conf` where `<chipset>` matches the name of your AGP chipset's manufacturer.

**Plug-and-play:** kernel 2.6 features updated USB support to keep up with emerging USB devices.

**Sound:** for those switching to ALSA, enabling OSS Emulation for backwards compatibility is highly recommended. After installing the new kernel, look up your card at the ALSA Soundcard Matrix at [www.alsa-project.org/alsa-doc](http://www.alsa-project.org/alsa-doc) for the appropriate modules.conf that enables the kernel to auto-load these modules.

**USB:** USB support in 2.6 has been overhauled. The modules for USB host controllers have been renamed from `usb-<type>` to `<type>-hcd` where `<type>` is ehci (USB 2.0), ohci or uhci (most Intel and VIA chipsets). USB keyboard and mouse support are merged into the hid module, while usbnet has absorbed most USB network link devices such as cable modems. For those with USB drives of any sort, cameras and card readers, usb-storage is a must.

**File systems:** the file system of your root partition must be compiled directly into the kernel, or it won't be able to load the files containing other kernel modules. Apart from ext3, reiserfs or xfs, you'll also need to enable support for the /proc and /dev/pts pseudo file systems so programs can monitor the system status via the virtual files stored within them.

#### PATCHING

As it's still early days for the new stable branch of the Linux kernel, don't be surprised if revisions soon appear. Thanks to patches, you won't need to download the entire 40MB tarball. The following example demonstrates how to update 2.6.1 to the first release candidate (alphas) of 2.6.2 which will be available from the /pub/linux/kernel/v2.6/testing/mirror directory in future.

```
$ zcat ~/patch-2.6.2-rc1.gz | patch -p1
```

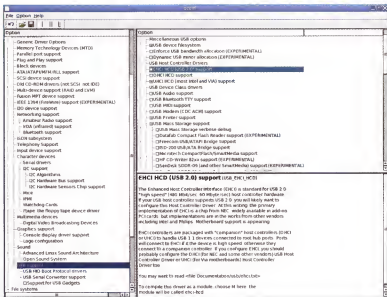
(Use `bzcat` instead of `zcat` for .bz2 compressed patches.)

Pay attention to any rejected parts. Some rejections are fatal, others can be ignored (if they apply to modules or platforms you aren't using) or fixed by hand. After patching the kernel, be sure to run `make distclean` to restore the kernel to a pristine state ready for recompiling. You will need to backup .config beforehand if you wish to reuse it. Once .config is restored, `make oldconfig` provides a useful way to default all questions based on the contents of your existing .config file and prompt you for the new compile options.

Some third party proprietary kernel drivers (most notably for nVidia video cards) do not yet officially support the new kernel, but work-around patches are available at [www.minion.de](http://www.minion.de).

#### RED HAT CAVEATS

Red Hat users should read <http://thomer.com/linux/migrate-to-2.6.html> before upgrading as many modifications are required for the 2.6 kernel to work perfectly. This article handles most of the system initialisation from the /etc/rc.sysinit script. Arjan van Ven of Red Hat has provided many Red Hat specific RPM updates for a lot of the tools listed above, as well as precompiled RPMs of the new kernel at <http://people.redhat.com/arjan/v2.6>.



#### COMPILING AND INSTALL

Use the following commands to build the kernel image, modules and then copy install them into /boot and /lib/modules:

```
$ make && make modules
# make install
```

Debian users can build a kernel DEB image using the tools included with the kernel-package and fakeroot packages.

```
# make-kpkg clean
$ fakeroot make-kpkg --revision=custom.1.0 kernel_image modules_
image
```

If you ever need to recompile the kernel, just rerun the above command, increment the version number and `make-kpkg` will only recompile what needs changing. Use `dpkg -i` to install the Debian packages created in the parent directory.

All that's left is to ensure that the default stanzas in /etc/lilo.conf (LILO) or /boot/menu.lst (GRUB) now point at the default kernel. Here are some examples:

```
LILO:
image=/boot/vmlinuz-2.6.1
        label=Linux
        read-only

GRUB:
title Linux
root (hd0,1)
kernel /boot/vmlinuz-2.6.1 root=/dev/hda2
```

After making the necessary changes, run `/sbin/lilo` as root if you're using LILO as your bootloader. GRUB users will need to run `root (hd0,0)` followed by `setup (hd0)` within the grub shell to update its configuration. Create an extra safeguard entry for your previous kernel. Once you reboot, you're ready to enjoy the Linux 2.6 experience. [www.linux.com](http://www.linux.com)



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# Print serving with CUPS

With CUPS, you can print from any computer to a Linux or \*NIX print server. **Andrew Lau** explains how you can jump to the front of the queue.

Setting up a print server on Linux for a multi-platform network is easy, thanks to Easy Software Products' Common UNIX Printing System (CUPS) and the creation of the Internet Printing Protocol (IPP) to support printing over HTTP.

CUPS is one of the first printing systems to implement IPP successfully, giving user-friendly usage of features — such as multiple pages per sheet, manual duplex, watermarking and fine control over dot dithering — that PostScript laser printer-owners take for granted.

## KERNEL PRINTER DEVICES

For CUPS to communicate with a printer, the correct kernel modules must be loaded. Parallel port printers utilise the `lp`, `parport` and `parport_pc` modules. The USB printer module under the 2.4 kernel is named `printer`, but on 2.6 it is called `usbipr`. (The USB printer module can only be loaded if Linux already recognises your USB host controller — that is, module `usb-ehci/uhci/ohci` in 2.4 or `[ehci/uhci/ohci]-hcd` in 2.6). Most Linux distros should auto-detect parallel ports or USB-connected printers; if so, `dmesg` on Linux 2.6 produces output similar to the following:

```
Parallel:
parport0: PC-style at 0x378 (0x778) [PCSP,TRISTATE]
parport_pc: Via 686A parallel port: io=0x378
lp0: using parport0 (polling).
```

```
USB:
drivers/usb/class/usbipr.c: usbipr0: USB Bidirectional printer
drivers/usb/core/usb.c: registered new driver usbipr
drivers/usb/class/usbipr.c: v0.13: USB Printer Device Class driver
```

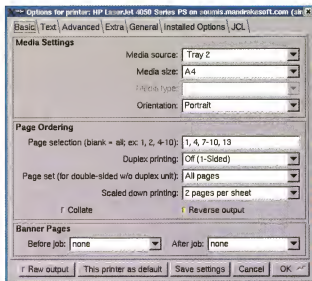
## INSTALLING CUPS

Before installing CUPS, it may be necessary to remove LPR/LPRng. On RPM systems, use `rpm -e PACKAGE_NAME`. Debian and the source install automatically overwrite it.

The source code for CUPS is provided on this month's cover CD set. (# denotes that root privileges are required, while \$ are commands executable by any user). It's highly recommended that you install any CUPS packages your distro ships. If you can't find an appropriate RPM on your install CDs, search for one at [www.rpmfind.net](http://www.rpmfind.net). Debian users can install CUPS by running:

```
# apt-get install cupsys cupsys-bsd cupsys-client
```

The latter two packages are optional. For backwards compatibility, `cupsys-bsd` contains a server that accepts and relays BSD-style print



Print and click: why print single-sided pages when XPP can print reverse-ordered odd-only double-sided 4-up at 720dpi?

jobs and converts them to IPP for submission to CUPS. Distros such as Debian (`cupsys-client`) and SuSE (`cups-client`) separate the client from the server to save having to compile the entire source on all network clients. If you compile CUPS yourself, here are the steps:

```
$ tar -zxvf cups-1.1.20-source.tar.gz
$ cd cups-1.1.20
$ ./configure
$ make
# make install
# /etc/init.d/cups restart
```

The final command manually starts the CUPS server — it should start on boot-up in future. (Debian users must substitute `cupsys` for `cups`.)

## WHO'S DRIVING?

All programs under Linux produce PostScript output for printing. PostScript is a language designed by Adobe to ensure that displayed output looks the same on any PostScript device. Not all printers support PostScript natively, so a filter is required to convert the PostScript before transmitting data to the printer. Ghostscript ([www.ghostscript.com](http://www.ghostscript.com)), supports hundreds of printers natively and is installed by default on almost all Linux distros. Manufacturers such as HP provide Ghostscript plug-ins ([Inkjet: http://hpinkjet.sf.net](http://hpinkjet.sf.net); Multifunction: <http://hpoj.sf.net>) for improved printing quality.

For an inkjet printer, especially one with photo capabilities, the Gimp-Print project (<http://gimp-print.sf.net>) offers high-quality



► *Print anything, anywhere: the CUPS Web console in action makes it easy to set up a new print server.*



printer drivers with extensive control over screening algorithms, colour generation and high-end printer features.

To determine which driver to use, find your printer in the comprehensive driver listings at [www.linuxprinting.org/driver\\_list.cgi](http://www.linuxprinting.org/driver_list.cgi). The "Foomatic" database recommends the driver that provides the best quality printouts for your printer and generates a PostScript Printer Description (PPD) file for that driver. A PPD describes all the features available for a printer model and how to use them. To register a PPD, save it to `/usr/share/cups/model` and restart CUPS. Foomatic's PPDs work in tandem with scripts from the Foomatic-filters package to transform the PostScript input and your printing options into a raster image.

The source code for ESP's enhanced fork of Ghostscript, HPIJS/HPOJ, Gimp-Print, and Foomatic-filters are available on this month's cover CD set. For offline users, the entire Foomatic database is also included, but it should be accessed online if possible. New users must use their distro's own native binary packages where possible.

## SERVER CONFIGURATION

CUPS provides its own Web console at <http://localhost:631>. Launch the Add Printer from Administration. Assign a single word to the Name field to uniquely identify the printer. The Location and Description fields are for your own benefit, so using a room number and brand/model will suffice. Select a connection method (you can even use a URL to another remote CUPS server). The next two prompts enable you to select a PPD and complete the process. The PPDs shipped with CUPS are generic, so use one that corresponds with your printer for best results. Additional options such as paper type and size if necessary. If you have multiple printers, you can establish classes to act as virtual print queues to balance jobs between them.

If you're going to use CUPS as a network server, you'll need to list the range of machines authorised to submit print jobs. Most users will only need to add `Allow From @LOCAL` at the bottom of the `<Location>` stanza in `/etc/cups/cupsd.conf`.

## \*NIX CLIENTS

CUPS supports automatic client configuration of printers on the same machine and subnet. You can also manually set the `ServerName` directive in `/etc/cups/client.conf` to the hostname or IP of the machine hosting the printer. Enable SSL if a server requires it or if you're printing sensitive material. Mac OS X Panther or Jaguar users will automatically see the printers; earlier versions need additional software. Look up [BrowsePoll](#) and [BrowseRelay](#) in the CUPS Software Administrators Manual (SAM) for handling servers and clients on separate subnets.

With CUPS, you may continue to use the traditional `lpr [-P <printer>] [<file(s)>]` command. Applications and desktop environments such as KDE's kprint and OpenOffice.org already provide sophisticated support for advanced printing features, while GNOME's support is still a work in progress. You can still take advantage of

these features within applications that don't support CUPS natively by using the X Printing Panel (<http://cups.sf.net/xpp>). To use it, simply replace the `lpr` command with `xpp` in the program's settings and a CUPS configuration dialog will prompt you to choose how you'd like your printing to be handled. Xpp is also included on this month's cover CD set.

## DANCING THE SAMBA

Samba is required for Microsoft Windows (SMB) clients to print via a CUPS server. If you don't already have Samba up and running, refer to APC December 2003, page 118 or the Samba Web Administration Tool (SWAT) at <http://localhost:901> once you've compiled it yourself.

Once you have CUPS running, just edit the following lines under `[global]` in `/etc/samba/smb.conf` and restart Samba.

```
printing = cups
printcap name = cups
```

Remote users should now be able to browse and send jobs to printers on your system, providing they have adequate privileges. Printers are listed in the form `\\<server>\<printer>`. Each Windows client requiring access to the printer must have a PostScript driver installed in order to submit a print job. Samba provides a mechanism to export printer drivers on SMB networks, but it can be problematic due to idiosyncrasies of each version of Windows. The SAM has details.

It's far easier to install the Adobe Universal PostScript Driver AdobePS (also on this month's cover CD set) manually, or alternatively, ESP's own CUPS Window Driver ([www.cups.org](http://www.cups.org)). When prompted for a PPD, use the same one Foomatic generates; this grants you all advanced PostScript features available under Linux.

## TROUBLESHOOTING

CUPS can record every step of the printing process in `/var/log/error_log`. If the `LogLevel` directive in `/etc/cups/cupsd.conf` is raised from the default info to debug. Running `tail -f` on this file as you attempt to print can reveal misconfigured/missing files or lack of permissions. If CUPS erroneously reports that your media tray is empty, it may have misdetected your USB printer. To fix this, edit the `DeviceURI` line in `/etc/cups/printers.conf` to point to `usb:/dev/usb/lp0`. All CUPS documentation can be found at <http://localhost:631/documentation.html>. [ETTC](#)



# Get a piece of the action

Actions are one of Photoshop's most powerful and versatile components. *Trevor Morris* rounds up over 100 of the hottest freeware actions.

Photoshop actions are similar to macros — a prerecorded series of commands that can be played back (at an accelerated rate) at any time and/or on other files. The two primary uses for actions are to automate redundant tasks and apply or distribute an effect or technique. They're also at the core of some of Photoshop's other powerful commands such as batch processing and Droplets.

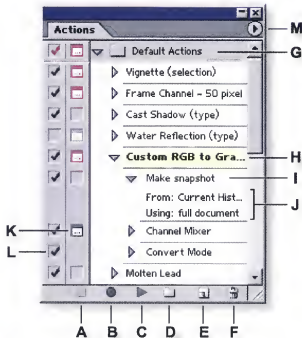
Part of what makes actions so popular is that they're easy to create and edit, convenient to distribute, simple to install and manage, and typically free (or low cost). However, as you might expect with anything that's free and popular, there are thousands available on the Internet. Normally, this wouldn't be a problem, but there are a lot of second-rate actions out there. And who has the time to download and evaluate them all?

Don't sweat it: APC has done all the hard work for you. This month's cover CD set is packed with 140 of the slickest and most useful Photoshop actions we could find. All have been tested with Photoshop CS (the latest version), and none of them require third-party plug-ins. All the actions are categorized by the operation they perform: Image Effects, Text Effects, Image Border, Photographic, Production, Texture Effect and Benchmark. So load up that cover disc and give them a try.

## LOADING AND INSTALLING ACTIONS

You don't have to actually "install" actions in order to use them: simply drag-and-drop the ATN file onto Photoshop and it's automatically added to the Actions palette. Handy if you're just evaluating the action. If you don't like it, simply delete it from the palette.

When you find an action you want to keep, installing it's a simple matter of copying it to the "right" location. Theoretically speaking, you can place actions anywhere on your hard drive (or network, for that matter). However, it's recommended that you keep them in the Photoshop X/Presets/Photoshop Actions folder (where "X" represents the version). Why? Well, that's where Photoshop assumes they'll be, so the Load and Save dialogs default to this location. Secondly, actions within this folder are automatically appended



**The Actions palette:** A. Stop Playing/Recording, B. Begin Recording, C. Play Selection, D. Create New Set, E. Create New Action, F. Delete, G. Action Set, H. Action, I. Action Step/Command, J. Actions Step/Command Details, K. Dialog Checkbox, L. Include Checkbox, M. Actions Palette Menu

to the bottom of the Actions palette menu for quick loading (after rebooting Photoshop). You'll also find it more convenient when backing up all your presets.

Once you've placed the actions into your Photoshop Actions folder, you can load them using one of two methods: by selecting Load Actions from the palette menu, or by quitting and restarting Photoshop and then selecting the action by name from the bottom of the palette menu.

Unfortunately, double-clicking on an action in Explorer doesn't open it in Photoshop. Although Photoshop is loaded (or brought to the foreground if it's already loaded), the action itself neither loads or plays.

## PLAYING ACTIONS

Actions are always stored within an action set — represented by a folder icon — they cannot be loaded or saved outside of a set. To play an action, you must first expand the containing set by clicking the right-facing arrow to the left of the corresponding folder icon. Select the action you wish to run and press the Play button at the bottom of the Actions palette.

Once playback begins, you can stop an action at any point by pressing the Stop button. Some actions even have built-in "Stops"

## The Definitive Guide to Photoshop Actions

[www.atncentral.com/installing.htm](http://www.atncentral.com/installing.htm)

Written by Danny Raphael, this 250-page tutorial is undoubtedly the most comprehensive Photoshop actions reference. Regardless of your experience, you're sure to find this an invaluable resource. Available as a download in both ZIP and SIT formats.



**Button up:** turn your entire collection of actions into a series of push-buttons using Photoshop's Button Mode option.

(informational dialogs with a Stop and/or Continue button). To resume a stopped action, simply press the Play button again.

Actions may also be executed via an assigned keyboard shortcut. To determine or (re)define an action's shortcut, just double-click to the right of the action's name — not the set name — or choose Action Options from the palette menu.

By default, actions play back at an accelerated rate — typically so fast that neither the document window nor the Layer palette thumbnails have time to refresh until playback is completed. While this is typically the desired playback speed, you may want to slow things down for the purposes of learning or debugging. To change the playback speed, choose Playback Options from the palette menu and select one of the three available options:

**Accelerated** — plays actions as fast as possible (the default).

**Step by Step** — allows the screen to refresh between commands (useful for debugging).

**Pause For** — pauses between commands for the defined number of seconds, between 1 and 60.

Actions can even be played back manually, one step at a time, by Ctrl+clicking the Play button.

The Actions palette can also be turned into a button panel via the Button Mode option in the Actions palette menu. Button mode turns each individual action into a coloured push button (colours are assigned using the Action Options dialog box). For those who can't remember their own phone number, let alone a stack of keyboard shortcuts, this is a quick and convenient way to replay frequently used actions. Keep in mind that many of the Actions palette's capabilities aren't available in Button Mode, so you'll have to switch back to Edit Mode in order to access them.

## SAVING ACTIONS

Each time you quit Photoshop, all the actions within the Actions palette are saved to a preference file (Actions Palette.psp). The next time you launch Photoshop, all of your actions and sets will appear exactly as you left them. Pretty handy, huh? But, be careful — if you drag-and-drop a downloaded action into Photoshop without keeping the original copy and your preference files become corrupt, you'll have no way to recover the action (unless you remember where you downloaded it from). Similarly, if you create your own



**Wet and wild:** a sample of one of the text effect actions on this month's cover CD set.

action and don't physically save it, you'll lose it if your preferences go south.

To save an action, select its corresponding set and then choose Save Actions from the palette menu. As explained earlier, actions can't be saved independently, so the Save Actions option isn't available unless an action set is selected.

## MANAGING ACTIONS

Here are five tips to help you organise and manage your collection:

- Give your actions — even the ones you download — meaningful names. Photoshop doesn't care if the name of the ATN file differs from the actual action or action set name.
- When downloading an action, download the thumbnail as well (if available). Make sure the thumbnail and the action have the same name. This allows you to use an Image Browser or Photoshop's own File Browser to view all your actions. If a thumbnail isn't available, use the action to generate one (if applicable).
- Photoshop recognises subfolders within the Photoshop Actions folder, so create folders to organise your actions by author/vendor, type, and so on.
- You can disable an action or an entire folder of actions by prefixing the name with a tilde (~). For example, Photoshop would ignore an action name ~Big Bubbly Buttons.atn. As for actions that you never use or don't work with your current version of Photoshop, get rid of them.

It's possible to delete an individual action without deleting the entire action set. The steps are the same: select the action or set and press the Delete icon (trash can), or drag-and-drop the action/set onto the Delete icon (or choose Delete from the palette menu).

To remove all actions from the Actions palette, open the palette menu and choose Clear All Actions. This command is permanent, so make sure you've saved your actions first. Alternatively, the Reset Actions command will clear all custom actions and simultaneously restore the factory default actions.

That's it. Enjoy the actions on this month's CD set and check out the Adobe Studio Exchange (see below) for thousands more cool and useful actions. <http://share.adobe.com>

## Adobe Studio Exchange

Adobe Studio Exchange is an online community for sharing actions, plug-ins, tutorials, and other Adobe product extensions. Registration is free at <http://share.adobe.com> and you can upload or download as much as you like. You can also browse by product, file type, ratings and so on, or use the search facility to locate specific files. The Studio Exchange is home to more than 4,500 actions, all of which are categorised with their own description and installation instructions, sample image and user ratings.





# Open to the public

If you're managing your own server, FTP is a great way to provide a public repository for files.

**Serdar Yegulalp** gets you organised.

Creating a personal FTP server for the home or office gives you round-the-clock access to your files, wherever you are. It's inexpensive, relatively easy to establish, and has a universal protocol that almost any computer with Internet access can use.

## INTRODUCING THE HOST

One of the best third-party FTP server solutions is Ipswitch's WS\_FTP Server. This big brother of the much-loved WS\_FTP client works on any 32-bit version of Windows (desktop/workstation editions as well as servers), with no restrictions on connections except for what the administrator sets and what the network allows.

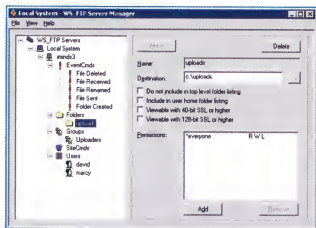
When WS\_FTP Server is set up, the administrator can choose between four different methods for creating and managing user accounts, each with their own benefits. The best choice for what type of user database to create depends on your scenario for using WS\_FTP. (The type of user accounts WS\_FTP Server uses can be changed after setup, but you'll lose the in-program settings.)

By default, WS\_FTP manages users via its own internal user database, which is only manageable from within WS\_FTP. This is the best choice for "quick and dirty" FTP, such as an all-anonymous server (where there are no user accounts except for the anonymous one) or where you want the tightest possible security and don't want user accounts guessed or derived from any other source.

WS\_FTP Server can also derive user accounts from the local computer or a remote Windows NT domain controller. In this case, WS\_FTP Server can also use NT's file and directory permissions for that user, which makes it easier to inherit permissions already established on files and folders. (The only exception to this rule will be the anonymous account, which should always be custom-configured.) This is the best choice for using WS\_FTP as a remote gateway to a file server, since the permissions established for each user carry over to FTP seamlessly.

An external user database allows the FTP server to work with user accounts stored in an external ODBC database. This option is best for providing customised FTP access. For example, a Web site which has its own community software with user accounts stored in a table could provide FTP access to the community site for its users through this mechanism. The administrator needs to provide the ODBC DLL, the name of the ODBC system data source, and the table name with the data in it. This is easily the most powerful option, since it can be programmed and scripted with a great deal of precision, but it's also the most difficult and should only be used when there's really no other way to give users custom access to the server.

Ipswitch IMail Server users can have WS\_FTP Server derive its user accounts from that program's user database.



**Choose your users:** WS\_FTP Server can derive user accounts from a variety of sources, but each user's settings for the server can still be separately edited.

## CONTROLLED FILE DISTRIBUTION

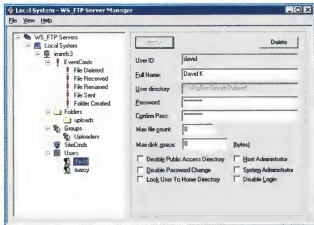
Once you've set up WS\_FTP Server, you'll discover that many of the more typical uses of FTP are substantially enhanced by specific features in the program.

For example, if you have files you want to make available to specific people you can use an FTP server to control distribution. Unlike email, FTP can transfer very large files (several hundred megabytes). WS\_FTP Server supports many of the more advanced functions of the FTP protocol, such as being able to resume a broken download (essential for big files) or transfer directly from one server to another (if the second server also supports it). This is a convenient way to move data in bulk from one server to another without downloading it to your machine and then back up again to the remote server. The only drawback is that it requires a client which also supports this function (the WS\_FTP client can do this through the Synchronisation feature).

One exceptionally useful feature for file sharing within an organisation is the ability to create a "public" directory within each user's directory. Anything placed in this directory is visible to every other user entering that directory. To prevent a user having a public folder, click on the user's name in the Users section of the Server Manager program and select Disable Public Access Directory. Anonymous users also have the power to see public folders, so you should disable this feature or restrict anonymous access to certain folders if you don't want anonymous users to access public folders.

## ANONYMOUS ACCESS

Anonymous FTP is one of the easiest ways to publish files for use by the general public. However, it's a risky business. For one, it means that anyone can log in without presenting user credentials. The password is customarily the user's email address, but there is no way to enforce the validity of an address.



**Incoming:** to create an upload-only directory, set the permissions for "everyone" on the directory to "write" and remove all other permissions.

If you have public directories and want to deny access to anonymous users, there is a work around. Create a dummy virtual folder in Folders and name it Users. Set its permissions so that anonymous users have no access to that folder, and set the "Do not include in top level folder listing" option so you don't get two copies of the Users folder. (If two copies of the folder do appear, they will both lead to the same place.)

#### ANONYMOUS OR NAMED UPLOADS

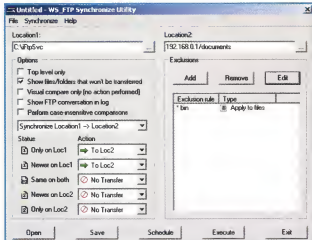
Many sites are used for uploads as well as repositories for downloads. For instance, users (either named or anonymous) could upload material to a designated FTP directory and then have it published for download into a series of alphabetised folders based on the first letter of the file's name.

An anonymous upload folder is easy enough. Create a new virtual folder (don't forget to create a matching physical folder on your system), then turn off all permissions except write for everyone. If you want people to see what's been uploaded to the directory already, turn on the list permission.

Once files are uploaded into the folder, an administrator can manually poll the folder. Thanks to WS\_FTP Server's EventCm function, it's possible to automatically trigger a script to relocate uploaded files to somewhere else in the server hierarchy or perform other kinds of processing on the file. Under EventCm in the Server Manager, select Enable Event Commands, choose the File Received event and check the Enable this command box. Place the path to your script in the Executable field, along with any command-line options such as the path to the uploaded file. A complete list of possible command-line variables is printed in the event command dialog. The script can be a batch file, a Windows Script file or a regular executable.

#### REMOTE AUTHORIZING FOR WEB SITES

It's customary to provide FTP access to a Web server to allow remote access to the files hosted on the site. Microsoft provides FrontPage Extensions for allowing direct access to pages through IIS rather than via FTP, though some people don't feel this is terribly secure. One way to do secure Web authoring with WS\_FTP Server (in conjunction with any Web server, not just IIS) is to use 40-bit or 128-bit SSL for the FTP connections, although you'll need an FTP client that supports



**In sync:** the WS\_FTP client supports the ability to synchronise between local and remote sites with scriptable rules about what to replace and what to keep.

SSL connections (such as WS\_FTP). To do this, create a virtual directory that points to the folders with the Web files in them, and in the property page for the virtual folder select Viewable with 40-bit /128-bit SSL (depending on which SSL strength you want to use).

#### FILE FETCHING FOR THE END USER

Of course, the most powerful FTP server in the world isn't much use without a client, and the WS\_FTP client complements the server in many ways. One of the features WS\_FTP has for transferring big files is a feature called multi-part transfers, where larger files are split into smaller pieces and transferred concurrently. Because each piece is handled as a separate connection, this decreases the amount of time it takes to transfer the file. Not all servers will work with this, however (it doesn't work at all in SSL mode), but it's worth trying for big transfers that don't always seem to go through well.

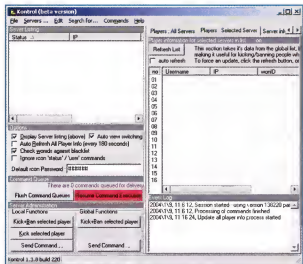
Another powerful feature that shouldn't be overlooked in the WS\_FTP client is its scripting ability. A script contains a series of FTP commands to be executed by the program (with some error-trapping ability); one of the sample scripts included with the application allows an entire site to be uploaded automatically.

WS\_FTP's Synchronisation feature is best suited to tasks such as uploading an entire site's worth of files, but only uploading changed files. This feature also lets you sync remote files to local files (and vice versa), with custom criteria for how to perform the operation — for instance, upload only newer files, except for files that match a certain extension or other wildcard. Synchronisations can also be rehearsed visually, so you don't have to experiment with live data to see if your sync rules work. [www.hugebrother.com/free\\_software.htm](http://www.hugebrother.com/free_software.htm)

## FTP tools

No-one who manages an FTP site wants to be caught unawares by a connectivity failure or a server crash. One way to stay constantly in the know about your FTP server's status is to use a monitoring program that checks the server at regular intervals. There are a few such programs, but Huge Brother Local Server Monitoring Tool ([www.hugebrother.com/free\\_software.htm](http://www.hugebrother.com/free_software.htm)) is both free and easy to work with. There's even a browser-toolbar version of the program for IE, which is also free.





**Kontrol freak:** KQuery's control suite is acclaimed by professional games server operators and hobbyists alike for its flexibility and power.

during late afternoon to early morning unless absolutely necessary — these are peak traffic times for Australian gamers in particular.

Games servers are anything but "fire-and-forget" in nature, as popular online gamers are frequently patched and updated by their developers as exploits or faults are ironed out.

There are two types of server patch. The first relates to minor fixes that can be run on the server only. These usually necessitate a restart of the server program, equating to minimal downtime. The second type requires both client and server to be patched. Such updates are usually incompatible with older versions of the software.


The upshot is that once the server is updated, users won't be able to connect unless they've upgraded their software. This means that timing the rollout of such upgrades on a server can be tricky. A good server admin balances the need to keep the server up-to-date while ensuring they don't accidentally lock out users.

## SPREADING THE WORD

The true measure of success when operating a games server is traffic. Game players are tribal, often settling into a select few favourites.

If you intend to leave the server running constantly, you should add your server to a "master list", an inventory of all the publicly accessible servers across the Internet. When game players start up their game server browser and search for online games, this is the list they'll usually use. The master list approach is simple: by sending a specific command to a designated "master server" (usually sorted by country), your game server is added to the list.

Many modern games support this function as an in-game option when setting up the server. The online games portal GameSpy.com features a guide for getting older games listed on master servers at [www.gamespy3d.com/using/servers.shtml](http://www.gamespy3d.com/using/servers.shtml).

One tack many games server operators take in an effort to keep users aware of the server status is to run a small Web site, preferably not on the server PC. At its most basic, the site can be a list of relevant details such as game server IPs, links to necessary files and a noticeboard listing when maintenance is scheduled. Additional elements can help create a gaming community of your own. Competitions, leagues and online forums will have players not only returning to the Web site, but also to your gaming server. 

## Server admin tools

Not everyone is comfortable with a maze of command line strings when configuring their games server. Luckily, programs have grown in sophistication since the early stages of online gaming. Whether you just wish to maintain more detailed logs of your server's behaviour or are looking to install the latest anti-cheat protection, the following tools will certainly make your life easier.

### GAMEHOST

[www.xoan.com/gamehost](http://www.xoan.com/gamehost)

A great tool that operates via a graphical user interface (GUI), Gamehost supports o who's who of online action gaming — all the Quake games, Half Life-based games, Tribes, Unreal Tournament and Return to Castle Wolfenstein just to name a few. Running on Windows NT/2000/XP onwards as a service, the software allows scheduled shutdown and restarting of your server, multiple server administration, remote control, automated server restart upon crashing — even the ability to assign CPUs to different server programs in multiple CPU machines. The software has a free 30-day trial period, after which admins have to purchase it. Well worth a look.

### PUNKBUSTER

[www.punkbuster.com](http://www.punkbuster.com)

The granddaddy of all anti-cheat programs works by validating individual clients against a central server, and players who are detected using cheating utilities are automatically removed from the server. Admins can also configure the software to remove players with offensive names, or even allow players in the server to administer the program in the admin's absence. The best news for server admins is that the software updates itself on-the-fly, so no complicated modification regime is required.

Punkbuster supports a number of popular action games, including Quake III, Rainbow Storm 3: Raven Shield and Return to Castle Wolfenstein. Support for the popular Battlefield 1942 is coming soon.

### CHEATING DEATH

[www.unitedadmins.com](http://www.unitedadmins.com)

Cheating Death is a client and server package designed for the popular tactical shooter, Counter Strike. The software operates by refusing identified cheaters connection to the server.

### KONTROL

[www.kquery.com](http://www.kquery.com)

A freeware server administration package for Half Life-based games such as Counter Strike and Day of Defeat, Kontrol has proved popular with professional games server outlets. The GUI-driven software not only kicks off and bans delinquent players, it also features a sophisticated logging system and — very handy for server operators with limited bandwidth — the ability to restrict bandwidth drain by players.



# Playing your cards right

## Buying a storage card for your handheld?

**Jenneth Orantia** gives you the lowdown on making the most of your new investment.

For storing hundreds of contacts, thousands of appointments and a few programs and Word documents, even low-end handhelds have ample storage memory. But if you want to do anything fun with your PDA — listen to MP3s, play games, watch videos or view digital photos, for example — you'll need to invest in a memory card.

These are typically flash memory-based cards that range in size from a postage stamp to a stick of gum. Unlike the main memory on a PDA, which is erased when the batteries die, storage cards use non-volatile memory and permanently retain their contents until you erase them yourself.

Some card types don't use flash memory. The most popular of these is the Microdrive, a hard drive-based card around the size of a CompactFlash card. These are also non-volatile, but the spinning hard drives inside such cards makes them vulnerable to damage.

At present there are five different memory card types commonly used in handhelds — Multimedia Card (MMC), SecureDigital (SD), CompactFlash (CF), Microdrive and Memory Stick (MS).

Each PDA can only accept particular types of cards, while lower-end models such as the PalmOne Zire 21 don't offer card expansion at all. Conversely, some PDAs have two expansion slots, allowing for two different cards to be used in the device at once.

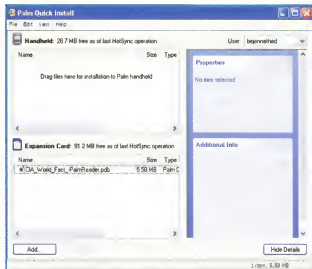
Some slots can accept more than one type of card. A CF slot, for example, is either Type I or Type II, with the latter able to accept Microdrives. The most popular type of expansion is an SD/MMC slot, which takes SecureDigital and Multimedia cards.



**Storage card toolbox:** Pocket Mechanic has everything you need to keep your card running smoothly.

## MISSING MEMORY

A popular misconception with memory cards is that they have the exact amount of available memory as advertised on the package. Unfortunately, this is never the case — a 256MB card usually has around 241MB of available memory. This problem is common with PC hard drives. Hard drive and memory card makers measure 1MB as 1,000KB, while PCs and other computing devices measure 1MB as 1,024KB. Additionally, a minor portion of memory is



**Click and drag:** installing programs to a storage card is as easy as clicking on the file and dragging it to the Expansion Card box.

reserved for file allocation tables, which are used to reference each file stored on the card for quick retrieval.

But if the amount of "missing memory" seems excessive, try reformatting the card. This can be done using a PC with a memory card reader, or on the handheld with a dedicated storage card program. Laptop users with a PCMCIA slot can also use an adaptor. All of these methods allow the card to appear as a separate drive on the PC. In Windows 95, 98, NT, 2000 and XP, right click the drive in File Explorer and select Format. In the File system list, select FAT and leave everything else as it is. But make sure to back up any files that you need on the card beforehand.

While there are no programs for the Palm OS dedicated to storage card maintenance (apart from the built-in Card Info app that offers a Format Card option), there are many for the Pocket PC. In addition to reformatting cards, such tools offer additional functionality like defragmentation, testing for errors and bad sectors, and cleaning up unused and temporary cache files.

One of the most full-featured and comprehensive is Pocket Mechanic ([www.antontomov.com](http://www.antontomov.com)). As well as the above features, it offers read/write speed benchmarks and a secure delete feature to overwrite sensitive files before deletion.

When experiencing difficulty with storage cards such as disappearing files and memory, scan for errors using a dedicated storage card program — these tools also attempt to fix any errors that are found. The other alternative is to reformat the card on the PC using a media card reader or PCMCIA adaptor, wiping the card clean. Sometimes the card is so damaged that a PDA or PC won't recognise it. In this case, contact the manufacturer as most cards offer three- or five-year warranties.



**Card trickery:** fool the OS into thinking the program is installed in main memory.



## RUNNING FROM THE CARD

Installing programs to the storage card is a great way to save space on your PDA; both Palm and Pocket PC devices support this feature. However, doing so on the former may require some tweaks to get the program running smoothly.

When installing programs on a Palm OS handheld (in particular OS 5.2.1 and up), you usually have a choice between the handheld or the expansion card using the Palm Quick Install utility. By default, programs appear in the list of items to be installed to the handheld, but dragging them to the Expansion Card box transfers them to the expansion card.

But this is no guarantee that the program will run properly when installed to a storage card, as some database paths are hard coded to the flat file system in main memory. Another problem when using the conventional method to install programs to a storage card is that HotSync only sees programs in the main memory during synchronisation. This creates difficulties if you're synchronising programs installed on the card with programs on the desktop.

Thankfully, these issues can be solved using third party launchers like Launcher X ([www.launcherx.com](http://www.launcherx.com)) and ZLauncher ([www.zztechs.com](http://www.zztechs.com)). Both programs transfer applications to the storage card as well as any related databases to fool the application into thinking it's residing in main memory. Using ZLauncher, just tap and hold on any icon (except for programs installed to ROM, as these can't be moved), select Move to Card and tap on OK. This places a small arrow icon in the bottom left-hand corner of the program, indicating that it's installed externally. A shortcut stub is also placed in main memory for that program. During a HotSync, any synchronisation process looking for the program will follow the shortcut and transfer data as normal.

Installing programs to a memory card on a Pocket PC is much easier. When a storage card is inserted, an option to install the program to a card appears in ActiveSync during the installation process. If this option doesn't appear, click on Tools, then Add/Remove Programs in ActiveSync, and make sure that the Install program into the default installation folder box isn't checked.

The general rule of thumb is that programs can be installed to a storage card unless the program's installation instructions say otherwise. The exceptions are things that need to load at startup, such as drivers, today screen plug-ins and other system utilities — these should be installed to main memory.

## EXPLORING HIDDEN TERRITORY

The Palm OS doesn't come with a file explorer, a holdover from earlier days when Palms didn't have expansion slots and everything was stored in one flat database system. While nothing's changed on the handheld itself, programs and files contained on a storage card are organised in layered folders. File organisation still doesn't have the

same significance as on a Pocket PC, as most files and programs on Palms need to be in specific folders to be found by the relevant programs or executed by the OS.

Nevertheless, being able to view file sizes on a storage card as well as in main memory (and being able to delete and move files at will) is a handy feature. When using the default launcher utility, only the programs are displayed, leaving you in the dark about all the other files that are currently residing on your handheld. Using a file explorer is particularly useful when trying to figure out where all of the memory on your handheld or storage card has gone.

The most popular freeware file explorer for the Palm is FileZ (<http://nosleepsoftware.sourceforge.net>), which provides filename and size information for all files stored in main memory and on a storage card. In addition, it facilitates beaming individual files, deleting, copying or moving files and managing directories.

Files on a Pocket PC, on the other hand, can usually be launched regardless of location on the memory card, allowing for much more leeway in organising files. The built-in File Explorer provides basic functionality such as displaying the date modified and size of each file. However, file extensions and hidden system files aren't displayed. Additionally, only one folder level is displayed at a time, making it cumbersome to transfer files from one folder to another.

A good alternative is Resco Explorer 2003 ([www.resco-net.com](http://www.resco-net.com)), an exceptional file explorer utility similar to Windows Explorer on the desktop. As well as offering a two-pane view and multiple folder viewing levels, it supports zip compression, encryption and includes a registry editor, built-in image viewer and network browser. [EITC](#)

## Reading your memory

*Transferring large files to a storage card on your PDA via HotSync or ActiveSync can be a lengthy and laborious process. Transferring a 5.69MB MP3 to a Pocket PC over ActiveSync takes 30 seconds. The same file transferred to a Palm (and the same SD card) over HotSync takes two minutes and 50 seconds. On the other hand, the same MP3 transfers in 13 seconds using a USB 1.1 memory card reader.*

*While using different cards can result in faster (or slower) write times, the speed differential between transferring files via synchronisation and using a memory card reader, particularly for a Palm OS device, is substantial. If you're in the habit of transferring large files, such as MP3s, movies, photos and graphics-intensive documents to your PDA, a media card reader is a good investment. They're available either as single or multiple format readers. The latter typically reads between six and eight different formats and is handy if you have other devices that also use media cards, such as digital cameras and mobile phones.*



# Watch and learn

Take the pain out of PC support by creating your own "walk-through" tutorials with Camtasia 2.2.

**John Dalziel demonstrates.**

Teaching people how to use new software is an often tedious but vital task. It takes the patience of a saint to walk everyone through the process, repeating the steps and answering the same questions over and over.

When problems arise, talking people blindly through their issues over the phone is also hardly an ideal situation. Windows XP Professional's Remote Desktop feature makes life easier, but you still need an Internet connection, and the host machine must be running Windows XP Pro.

Here's a better way: record your mouse movements, clicks and keystrokes with TechSmith's Camtasia. Its users can create a tutorial "mini-movie" that can be sent via email or posted to a Web or intranet site for users to download and play next time they need a walk-through. You can even annotate the clip and add commentary to explain your actions step by step. This month's cover CD set includes a full version of Camtasia 2.2, and this Workshop shows you how to create a simple video clip.

## UP AND RUNNING

The initial Camtasia interface presents you with three windows: the main "recorder" window, a set of help notes, and a "tip of the day". Both the tip of the day and the help documentation are a great way of learning how to use the application, but for the time being, shut them down and focus on the Camtasia Recorder.

All the main tasks have a menu item, a toolbar icon and a keyboard shortcut, so you can work whichever way functions best for you.

As an example of how it records your actions, try opening Internet Explorer (IE) and heading to [www.techsmith.com](http://www.techsmith.com). Then jump back to the Camtasia recorder menu and choose Capture > Input > Window. This instructs the recorder to capture the contents of a window (your other options are to grab the full screen or a smaller user-defined region of the screen). Now hit Camtasia's record button and you're ready to start. As the mouse roams around the Web page you'll notice a red box outlining each element and window. This indicates the parts of the window that will be captured. To capture the whole window, move your mouse to the top of the browser until the entire IE window is outlined in red.

With that done, click your left mouse button. The red outline turns to four green corners and you're rolling — everything inside the green corners is captured. Try some simple tasks, such as adding the site to the Favorites menu, changing the font size or some other common task. Of course, you can also click your way through some links on the TechSmith site, as if you're demonstrating how



► **Desktop movies for dummies:** the simple interface of Camtasia's Recorder applet makes it easy to get started.

to navigate around the site. When you're finished, press F10 to stop recording and save the movie file, which is written to the hard drive in the popular AVI video format.

## THE CUTTING ROOM

Just like conventional digital video software, Camtasia lets you edit the movie by assembling individual clips as well as standalone images. The place where this all happens is Camtasia Producer.

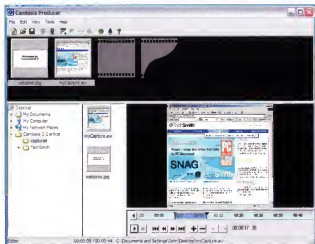
Its file explorer is used to locate all the "assets" needed for your project, such as captured movies and image files (in BMP, GIF or JPEG format). You can drag them straight onto the storyboard at the top of the Producer window, or tweak them in the Editor on the right-hand side first. In this instance, start by dragging the movie you've just created into the editor.

The controls at the bottom of the window play the movie back. The first thing you'll notice is that you've probably captured a lot more action than you actually need. Use the plus and minus buttons to trim off the excess.

Anything blue on the timeline will be output, so by default, everything is shown. To remove a section of video, drag across the timeline to highlight it and then click the minus button to remove it. You'll notice the removed section turns white. Try removing the first 10 seconds, leaving the next 10 seconds and removing the rest. If you remove a section by accident, don't panic — to put it back, you need only drag across the area again and hit the plus button to re-insert it.

When you're finished, drag the movie from the editor into the second frame of the storyboard. For a fancy intro, try adding a still image as a title frame.

If you right-click on the image in the first frame you'll see a range of options. Select Duration and enter five seconds into the pop-up



**The finishing touches:** use the Camtasia Producer applet to edit your video recordings, add titles and transitions, then package it all into an AVI clip.

box, then hit OK. Now right-click the second frame and select Transition Effect. When you see the pop-up box, check the Enable a transition to this clip checkbox. Try the transitions until you find one you like, then hit OK.

#### MAKING A PRODUCTION

With your short film all finished, it's time to package it, ready for distribution. Camtasia's File menu includes the Production Wizard option, which automatically walks you through creating a project that's ready to email, upload, stick on a server or burn onto a CD. As you get more accomplished with Camtasia you can manually drive the process using the Produce Movie option, but for now, use the wizard. Accept the default setting to "Produce an AVI movie file" and hit Next to pick a movie size that suits your needs.

If you're planning to put the file on the Web or send it via email, you may want to keep the file size as small as possible — although this reduces the quality of the movie. If you're planning to distribute it on CD or a local network, you can afford to go for a larger file with higher quality.

The next few steps of the wizard let you add information about your clip and include your own watermark on the movie. When you reach the end of the process, click the Finish button to render the project into a self-contained AVI file. When the renderer finishes, it will launch the movie in the Camtasia Player.

#### FROM SILENT MOVIES TO TALKIES

For the simplest processes — tasks which take no more than a few mouse clicks — a video clip alone will probably suffice. But more involved tasks may benefit from some form of commentary.

There are a number of ways to add audio to your Camtasia movies. The most straightforward method is to capture audio at the same time as the screen capture, narrating as you go. The tip here is to make sure you have something resembling a script to follow, or at least a set of talking points, so you avoid littering your voiceover with annoying "ums" and "ahs".

The Audio menu of Camtasia Recorder's Effects has three options. Record Audio picks up any audio from your microphone and adds it to the soundtrack of the AVI, while Cursor Sounds and Keyboard Sounds apply sound effects to the soundtrack to coincide



**Listen up:** take the tedium out of larger tutorial how-to movies by adding audio narration.

with mouse clicks and keyboard taps. The Options > Preferences > AVI menu reveals a set of audio options. In addition to selecting the input device, you'll notice an interleave audio box. Most of the time you should leave this alone, but if you're working with very large files, increase the interleave time to greater than a second. This reduces the smoothness of the audio playback but produces substantially smaller files.

The typical way to optimise audio is by configuring the sample rate of your captures. In the Audio Setup box you can configure both the codec and the sample rate. A faster sample rate collects more data, which creates a bigger file. If you're not too particular you can use the presets from the drop-down at the top of the box.

Uncompressed PCM audio is Camtasia's default and recommended audio capture format. Some Windows audio codecs may not be available for compression — for example, the Windows Media Audio codec can be used only for compression of Windows Media (ASF/WMV) files.

Keep in mind that adding audio increases the file size of AVI movies. With some careful adjustments you can strike a good balance between quality playback and manageable file size. Camtasia's default codec is TSAC (TechSmith Capture Codec) developed in-house by TechSmith to compress images that contain large blocks of the same colour. This makes it ideal for capturing full-colour video of desktop applications in action. [\[1\]](#)

## Camtasia Studio 2

*If you like Camtasia, you might want to see what Camtasia Studio 2 has to offer. This latest incarnation has been built with professionals in mind, with a funky new look that ensures your workflow is as simple and as fast as possible. This includes real time live preview of edits and transitions, the ability to import your own video files into the project and to export Camtasia movies as Macromedia Flash files.*

Camtasia Studio 2 retails for around \$430. For more details, visit [www.techsmith.com](http://www.techsmith.com) or contact Camtasia's Australian distributor Code&Data ([www.code.com.au](http://www.code.com.au)), and check out our full review in APC January 2004 (page 58).



PC, PS2, Xbox

## BEYOND GOOD AND EVIL

**A corrupt military, a puppet media spreading propaganda, and a planet scared for its future. And best of all, it's not Earth. Justin Kranz explores.**

Those curious as to how Nietzsche's work translates to game format may be disappointed... It's not that *Beyond Good and Evil*. But the video game *Beyond Good and Evil* (BGAE) is thought-provoking in its own right. An action-adventure pitched at mature audiences, it centres on the inhabitants of the planet Hillys, who have been locked in an ongoing battle against alien forces. When photographer and protagonist Jade tries digging into the roots of the conflict, she discovers that the defending forces — the elite Alpha Section — are not all they seem. As the story progresses, Jade uncovers a vast conspiracy, which, of course, makes her a target.

Throwing her lot in with the local resistance, Jade documents her discoveries with her camera. She is useful in hand-to-hand combat with her trusty staff, as well as in throwing discs. The combat action is reminiscent of *Oni* or *Prince of Persia: The Sands of Time* (reviewed *APC* February, page 154). An excellently implemented camera remains unobtrusive, but allows players always to feel in control of Jade, whether she's running around in third person mode, riding a hovercraft, or sneaking through some of the stealth levels which are apparently compulsory in this type of game. The vehicles she rides can be upgraded to carry weapons — this too is smoothly integrated into the story, rather than just plunked in as an afterthought.

*Beyond Good and Evil* has some of the best animation yet on PC or console. Masterful use of light, shadow and colour complement the excellent movement, while effects and reflections are remarkably clean without being so pristine as to defy reality. The entire game is presented in wide-screen, subtly reinforcing the cinematic, plot-heavy action. For gamers without wide-screen displays or small monitors, however, this effect is wasted.

The character models and environmental design are a credit to the developers. A lot of imagination has been employed in depicting the inhabitants of Hillys — while Jade is human, not all those she encounters are, but many are sociable animals. Lesser offerings may have fallen into the trap of looking too childish in such an approach, but BGAE has enough flair to breeze past such concerns. The architecture of the world structures is equally sophisticated, with an eclectic array of design cues in evidence. The effect is akin to a three-dimensional animated feature, but the cartoon look is offset by the content.

To take full advantage of the high-resolution visuals on a PC, you need a GeForce FX or Radeon video card. And that's typically more expensive than the cost of a console and the game combined. Many will question why a modestly specced PC can't compete with a PlayStation or Xbox of similar vintage without expensive improvements.



**Animal attraction:** eye candy abounds in BGAE.

That said, *Beyond Good and Evil* proves once again that thought-provoking plot and story development are the driving forces in the modern games market, rather than high polygon counts or realistically-modelled hair follicles. And up until recently, gamers had to choose between graphics or gameplay. BGAE is the best of both worlds — it's one of the best looking titles on the market and has a great story to boot.

The story of high-level collusion and corruption — complete with underground resistance struggling against impossibly powerful foes — can come across as cloying and pushily idealistic. But in its defence, the values the game promotes are of endearingly moral independent thought and curiosity. If Nietzsche had been partial to games, he surely would approve.

**Contact** Ubi Soft

**Online** [www.beyondgoodandevil.com](http://www.beyondgoodandevil.com)

**Price** \$89.95

**Verdict** ●●●●

# NEVERWINTER NIGHTS: HORDES OF THE UNDERDARK

After a role-playing game drought, Bioware delivers the goods with a classic *Neverwinter Nights* expansion pack.

When role-play game (RPG) developer Bioware released *Neverwinter Nights* (NWN) in 2002, part of the game's hook was the ability for players to extend the playing life span by creating their own new campaign modules. Taking this course committed the company to developing its own expansions as well, as much to demonstrate faith in NWN as a "platform" as anything else.

Hordes of the Underdark (HOTU) is the second such expansion pack and is intended loosely to follow on from the first pack, *Shadows of Undrentide*. If their characters meet the criteria, experienced hands can take their beloved players from the original *Neverwinter Nights*. Otherwise players can select a pre-made character or generate their own which is raised automatically to the appropriate level.

All is not well in the town of Waterdeep. The Underdark — a series of subterranean

dungeons built beneath the city streets by a crazed wizard — has been untouched for years. Now a growing menace is rising up and attacking the community. You, the new adventurer in town, are assigned to figure out who is behind the attacks, and if all the good city folk of Waterdeep are who they say they are.

You aren't alone in your quest — computer-controlled companions lend a hand. On the positive side of the ledger, these AI henchmen have their own stories, having featured in past *Neverwinter Nights* adventures. But a common complaint about computer-controlled characters surfaces here — occasional poor pathfinding and decision-making. Outside the obvious combat scenarios, their self-preservation skills are as lacklustre as their situational awareness. So when you unleash that fireball, hurl that bolt of lightning, or release the poison gas, ensure your companions are safely out of harm's way.

New players will largely spend the first chapter familiarising themselves with the characters' abilities and skills. Meanwhile, players carrying over characters from past adventures will find the level a little ho-hum. It heats up from then on, however, with more plot twists and betrayals than a season's worth of reality TV.

Players will find that a steady progression in ability is essential to advance deep into the game — only the most seasoned players will be able to race through it. Good players will find Bioware's estimated 20 hour completion time about right on the money. The multitude of diversions and character development opportunities mean that many players will take longer than necessary, just to be sure that they give the game a thorough working over.

Bioware has spent a lot of time working on player development options to keep the incentive high for gamers wishing to restart the game after completion. A number of "prestige classes" are available, which allow players to give their in-game persona some individuality. It's necessary to perk up things in this fashion, as players will be using characters more powerful than those usually used in role-playing games



**Graphic goodness:** improved graphics are a bonus.

— and the incentive to develop for the sake of it wanes rapidly. The ability to breathe fire — a skill available to the Red Dragon Disciple prestige class — means players teaming up with others for multiplayer action have something in the way of bragging rights. An increased range of abilities, weapons, spells and feats catering to high-level "epic" play also helps players indulge their medieval superhero fantasies.

Bioware has lifted its graphical game slightly in HOTU, with Improved tilesets (the scenery chunks that form the environment) as well as some nice customisation touches for characters. More player portraits, new varieties of clothes and the ability to see a proper sky are all signs that Bioware is cranking every last grunt out of the NWN graphics engine. The camera options have been relaxed even more, so players are able to view the action from any angle they desire. It's a mixed blessing: zooming down to a third-person style level mainly serves to underscore how role-play games lag behind other game types in the eye candy stakes. However, it's a nice match for the game structure improvements.

As all players need the original *Neverwinter Nights* to play HOTU, APC recommends newcomers pick up a Gold pack, which includes the game and the first expansion pack, *Shadows of Undrentide*, and add HOTU for a very lengthy role-playing experience. Taking this path is a lot less disjointed than jumping in at HOTU's advanced level with one of the game's presets or newly generated characters. It's not the story mechanics that will cause difficulty, but rather the lack of any prior "ownership" of the person you're controlling in-game. However, perhaps it's a mark of just how high is the quality of its expansion that it's worth investing so many hours of effort and dedication.

Contact Atari Australia

Online <http://nwn.bioware.com/underdark>

Price \$49.95

Verdict ●●●●●



**Out of the way, stupid:** AI characters aren't so smart.



## LORDS OF EVERQUEST

PC

On one hand, there's the soaring popularity of real time strategy (RTS) games. On the other, there's the established, immense popularity of EverQuest, the online RPG. Smelling profit, Sony put two and two together and produced Lords of EverQuest (LOE), an RTS set in — you guessed it — the same world as the RPG.

However, despite the brand popularity and a galaxy of stars lending voices to characters in-game, Lords of EverQuest never really hits the mark as an RTS. There are some good ideas, but they're undeveloped. Take the issue of resources. Most RTS titles have a detailed multi-resource-gathering model to allow players to micromanage troops and structure development. LOE has a strictly monetary approach. If you have the funds — raised by mining platinum — you can start amassing units. Slowly. The cost-versus-resource-availability ratio means that only the most patient and methodical resource scavengers will amass a truly awe-inspiring army.

Compared to Warcraft III and Age of Mythology — accepted as the current competitive standard — the rate of troop build-up is sluggish, so lightning fast raids on your opposition with a small cadre of troops are

unlikely to yield success. It's easy to "run and gun" with a few units against a numerically superior enemy, which is good news for inexperienced players as it allows them to hold out for a longer time against better opponents. However, they're only prolonging the inevitable.

Another area likely to annoy seasoned strategy gamers is the AI of their units. Players used to the computer using common sense in arraying troop formations in the heat of battle will despair at the ease in which the CPU gets confused. Archers to the back, fighters to the front seems a simple premise, until some LOE nasties hijack your troops and massacre the archers and spell-casters who didn't clear the way for your melee troops.

Lords of EverQuest's play is definitely skewed towards novice RTS gamers, which isn't



**Lord of the quest:** frustratingly, the story seems to be never-ending.

necessarily a bad thing. But the game can be unbalanced and unrewarding in both single multiplayer mode. With gameplay flaws so fundamental that they affect both single and multiplayer modes, all but beginners should look elsewhere for their RTS fix.

**Contact** Ubisoft

**Online** <http://lordsofverquest.com>

**Price** \$89.95

**Verdict** ●●●○○

## NFL STREET

PS2, Xbox

Electronic Arts has a track record for taking a successful formula and running with it. Recently, the company has focused on fleshing out its selection of "serious" sports simulations with arcade-style variants. So instead of NBA Jam, you get NBA Street, and now, instead of the venerated NFL Blitz, you have NFL Street.

Questions about originality aside, there's no arguing that EA's products eclipse the games which form their inspiration. NFL Street is seven per side gridiron. No specialist teams for defence and offence, no helmets, just hyperactive action. It's perfect for Aussie sports fans, many of whom only have a passing awareness of American football. You don't need to memorise complex playbooks, or know the difference between a "sack" and a "blitz". All you need to know is how to point your player at either the opposition end zone or ball carrier and unleash mayhem.

The graphics and animation are over-the-top, but still manage to retain strong similarities to the actual NFL players they're modelled on. The playing areas are a little different to the usual stadia, however. True to the name, players play on a variety of gritty environments — from roads to playgrounds, even inside warehouses

and atop buildings. The environments are interactive, adding to the style factor when you use a little lateral thinking in your play.

As in NBA Street, performing flashy moves and scoring — something that happens liberally — builds up a "Gamebreaker" meter. When the meter fills completely, players can activate it for some nigh-unstoppable moves. The beauty of this meter's implementation in NFL

Street is that it can be used in attack or defence — sometimes stopping the opposition scoring is more important than your team winning easy points.

Its normally a tough ask for local sports fans to get excited about gridiron games, but NFL Street is an exceptional title deserving of attention. If you're partial to having a few mates over for multiplayer gaming, this is entertaining



**Skid Row:** get ready to rumble — this street ain't called Sesame.

sports action that doesn't take itself too seriously. Coupled with a strong single-player challenge with plenty of different winning conditions beyond mere scoring, there's no reason not to hit the Street.

**Contact** Electronic Arts

**Online** [www.easportsbig.com/games/nflstreet](http://www.easportsbig.com/games/nflstreet)

**Price** \$89.95

**Verdict** ●●●●●



# DIGITAL VIDEO COMPRESSION

With the growth in popularity of digital media, an increasing number of beginner and intermediate computer users have been forced to understand the complexities of compressing digital content.

*Digital Video Compression* is pitched at these users, and describes how digital image compression works, some elementary compression techniques, and how to maximise quality while minimising file sizes. Analysis of various common (and a few relatively uncommon) compression techniques is offered, and chapters include information on entropy coding, transforms, and quantification.

The title covers the breadth of digital video and still image compression for creating DVDs, editing and creating streaming video. It also includes a detailed glossary.

A bundled CD contains applications for compressing images and video, along with sample pictures and footage. Unfortunately the applications are for Windows only, so Linux and Mac users will have to hunt down their own on the Internet.

The book provides adequate information for newcomers to get a handle on the basics and its tone is generally light enough to read away from a computer. Be warned though: the mathematics can become somewhat heavy in parts. Specific information on more obscure formats like the emerging MPEG-21 format is fleeting, but at least it's been covered — much to the author's credit.

People seeking to optimise their Web graphics or movies will find the book useful, though the mathematics and in-depth analysis will only appeal to the most curious.

**Matthew Overington**



**Publisher** McGraw Hill Education

**Price** \$98.95

**ISBN** 0071424873

## HOW TO DO EVERYTHING WITH HTML & XHTML

The popular *How to Do Everything* series sets itself a hard goal to kick — and while it doesn't quite teach you "how to do everything", it does deliver a great deal of basic information.

The book starts out on the same path as the popular *Dummies* series, taking readers step-by-step through HTML basics such as converting text to HTML, formatting paragraphs, adding images to Web pages, and using tables for data presentation. More mid-level concepts such as HTML forms, Cascading Style Sheets (CSS) and JavaScript are then introduced, allowing readers to build on the topics previously covered. All areas are complemented with practical examples for readers to copy and include in their personal Web sites.

The final two chapters get hands-on with XHTML, stepping through the process of rewriting HTML as XML and creating your first XHTML Web page. The normally perplexing topic of Document Type Descriptions (DTDs) is dealt with in a clear and straightforward manner, leading readers through the process of creating a new DTD for a sample XHTML page. XML Cascading Style Sheets are also covered and illustrated.

Although written for a non-technical audience with little or no coding experience, the basic content covered is comprehensive and useful. It allows the reader to progress easily to the more complex and challenging concepts introduced later in the book.

Overall, this title is a useful starting point for beginners or intermediate Web site builders looking to get a handle on XHTML basics.

**Dan Lowden**



**Publisher** McGraw Hill/  
Osbourne

**Price** \$39.95

**ISBN** 0072231297

## THE ART OF JAVA

*The Art of Java* is a brilliant guide to producing intensely useful and technically advanced Java applications, ranging through: parsing numeric expressions; building a Web crawler (adhering to well-defined protocols); implementing an actual computer language; building a complete email subsystem; constructing a streamlined download manager; and more.

These are sophisticated and fascinating Java programs reflecting deep concepts in computer science. The chapters — and their applications — are not merely individual, isolated, programs, which have no bearing on what has gone before. Rather, each chapter seeks to demonstrate particular features and technologies of Java, with the applications really only being present to illustrate the concept. It just so happens they are highly significant, real-world applications, and not simply trite pieces of code as found in lesser programming works.

Authors James Holmes and Herbert Schildt are touted as "two genuine Java gurus", and this is not a "how-to" Java programming book or an introductory work. Those new to Java will be out of their depth here.

Where this title excels is in its masterful respect and love of the Java language. This is where the "art" of the title comes in: the authors clearly have a passion for Java and its capabilities.

As such, this is a truly outstanding book and a must-read for any serious Java programmer.

**David Williams**



**Publisher** McGraw Hill/  
Osbourne

**Price** \$74.95

**ISBN** 0072229713

## ABSOLUTE BEGINNER'S GUIDE TO BUILDING ROBOTS

The *Absolute Beginner's Guide To Building Robots* introduces all the basic skills and resources needed to construct hobby robots. Immediately compelling, it never loses its way as it ploughs through a plethora of topics.

Beginning with a fascinating history on the origins of robots, it leads through to robot kits available today (Lego Mindstorms, for example), as well as off-the-shelf robots (such as Sony's Aibo).

The book culminates in three hands-on projects: building a walking coat hanger; animating an old computer mouse; and a walking CD rack with an embedded micro controller for brains, programmable in Visual Basic. These projects all demonstrate solid techniques and show how robotics is limited only by the imagination. Best of all, they use as few commercial parts as possible, preferring to recycle household junk.

The book concludes with a detailed, annotated list of

books, magazines and Web sites for reference.

This title is a delight to read; it's absorbing, entertaining and its greatest attribute is its sheer sense of fun and enthusiasm. It's clear this is an author with an enquiring mind and an almost childish fascination for robots, and his pure sense of wonderment is sure to infect even the most technophobic reader.

Its tone is also wonderfully reminiscent of the "hacker" spirit possessed by those greatest of computer scientists and hobbyists who really strive to understand just how technology works, and how to develop it themselves.

Anyone with an interest in the subject will find this a tremendously engaging and enjoyable read.

**David Williams**



**Publisher** Que  
**Price** \$39.95  
**ISBN** 0789729717

## COMPLETE WIRELESS HOME NETWORKING

Despite its obvious advantages, wireless networking has suffered from an unusually slow take-up. Either unaware of its capabilities or wary of its various standards, consumers have opted to retain the status quo and persist with their CAT-5 cabling and Ethernet connections.

Installing a wireless network is a painless process, however, and as explained in *Complete Wireless Home Networking*, it should be considered by anyone seeking greater flexibility from their network.

As a basic introduction to network theory (wireless or otherwise), there are few better sources than this book. The opening chapters explain what a network is, why you would want one, and how wireless works. The discussion surrounding the various wireless protocols — 802.11a, 802.11b and 802.11g — is particularly helpful.

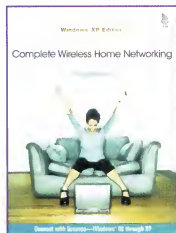
But theory is useless without a practical guide as to its application. Fortunately, this title also delivers on this front, with step-by-step guides to installing a wireless network

in either Windows 98 or XP. All instructions are well written and supported by numerous screen shots and diagrams, so readers should have no difficulty in achieving the same result.

Recognising that a complete wireless solution will not be appropriate for all users, the author also describes how hybrid networks can be implemented to allow for the best of both worlds. Further instruction is provided in adding extra functionality to the network through sharing an Internet connection, using email or setting up a firewall to ensure security.

*Complete Wireless Home Networking* is essential for anyone considering adding wireless functionality to their network, or even for those installing their first network of any description.

**Alan Crawford**



**Publisher** Prentice Hall/Penguin Australia  
**Price** \$34.95  
**ISBN** 0131461532

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### OUTGOING MODEM or EFT-POS

Choose AUTO-CONNECT when you wish to fit a Modem or EFT-POS unit to your Fax line, to make OUTGOING calls. Provides automatic connection on dialing. Other device is then tried out. Ideal for connection of Payphones, Modems and EFT-POS to any Fax, Commander, FAX or any type of Telephone line.



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Record your telephone calls to PC, or other recorder, from an ordinary single line or any multi-line phone system. Automatic operation with start/stop capability from any handset. PC software & cables supplied.



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### AUTOMATIC ATTENDANT

Our single line CALL ATTENDANT will answer your incoming calls after 4, 6 or 8 rings, play a greeting & message to your callers until you are able to answer. Also provides Message on Hold facility.



## CONTROL YOUR EQUIPMENT BY TELEPHONE LINE

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Call in to Switch ON, Switch OFF or RESET your PC, SERVER or any electrical equipment by telephone line using touch tone commands. RTA connects to any telephone line. Requires PCU or PCR accessory.



### RTA-PRO VERSION

PRO version provides independent control of 2 status outputs, with PIN number security. Status tones for each output are provided on answer. Shares an existing line when used with the Multiple Number service.



### POWER CONTROL UNIT

PCU connects directly to the RTA and also to your power socket to allow telephone line dial in switching of the 240V supply connected to your equipment. Easy Plug In User installation. Controls up to 10 Amps.



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PCR connects to any PC to allow remote telephone PC RESET, or can also be used to turn ON or OFF PCs with ATX style motherboards. Easy User Installation.



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This unit provides for quick and easy mounting direct onto any wall surface. Your visitor just presses the integral call button to ring your telephones. Provides clear 2 way communication as soon as you answer.



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This attractive Stainless Steel unit is designed for a flat recessed fit into your wall surface. Your visitor just presses the integral call button to ring your telephones. Provides clear 2 way communication as soon as you answer.



### TELEPHONE CALL TRANSFER

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## ARE YOUR PRODUCTS OR SERVICES WORTH TALKING ABOUT ?

### TALKING DISPLAY UNIT

TDU will play 1 or more pre-recorded messages as soon it is triggered by a movement sensor, a switch, or at a preset time interval. Ideal for Product Promotions, Product Information, Message Warnings etc.



### MULTIPLE INPUT UNIT

MUI allows for up to 12 separate movement sensors or switches to be connected to the TDU. Each sensor triggers its own unique message, output via any 8 ohm unpowered, powered or amplified speaker.



### SPEAKER SWITCHING UNIT

SSU allows for up to 12 separate speakers to be connected to the TDU so that each sensor triggers its own separate message, output on its own separate speaker. Background music can be played at all other times.



### AUDIO SWITCHING UNIT

ASU allows the TDU to be connected to any existing PA or Background Music system. The existing PA or Background Music system is then muted or faded whenever a TDU message is broadcast and then reconnected when finished.



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Provides all facilities of the PRO model and in addition will generate CallerID (Calling Number Display) output in conjunction with any Telstra ring pattern. Provides 10 preset outputs, plus alphanumeric & user definable transmissions.



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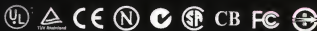


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# Real Surround Sound Zalman Headphones

## Theatre 6

Real Surround Sound field close to a complete multi-channel speaker system.  
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In your PC equipped with a DVD-ROM for games or DVD movie.  
Excellent fidelity, enhanced localization of on-screen sound, clear dialogue hearing and better feeling on a discrete sound.  
Enhanced spatial and realistic effects by separating front, rear, and center speakers.

Use: PCs with 5.1 Ch Sound Cards | DVD Players | Home Theaters | Game Consoles



Front

Rear

Center



**5.1 Ch** equivalent  
**6 - Speaker** Headphones

### Specification

- Model Name: ZM-926P (Theatre 6)
- Unit Type: Electro Dynamic Round Type Micro Speaker
- Frequency Response: 50Hz ~ 20KHz (extension effective)
- Sound Pressure Level: 95dB +/- 3dB at 10mW
- Impedance: 16 Ohm at 100Hz
- Maximum Power: 0.5W
- Maximum Power: 0.15W
- Weight: 11.2oz (316.8g) without packaging
- Cord: Straight, Break away 8.8ft (2.69m)
- Plug: 3 headphone jacks (0.3, 3.5mm)

### [ Real Surround Sound Headphones vs. Virtual Surround Headphones ]

Real Surround Sound Headphones produce a real surround field as it is being reproduced from a complete multi-channel speaker system with separate front, rear, and center channel speakers, and five discrete sound sources, directional, spatial, and realistic effects. A virtual surround headphones imitates a sound field through two speakers based on DSP technology.

DSP: Digital Signal Processor, which processes analog signals by means of analog-to-digital conversion and filtering through logarithmic operations, is ultimately for real-time digital signal processing.

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T007	\$37.00	\$10.80	T028	\$50.00	\$11.20	T0422C	\$24.00	\$13.50
T009	\$49.00	\$16.90	T029	\$48.00	\$13.75	T0423M	\$24.00	\$13.50
T013	\$27.00	\$ 5.60	T038	\$23.00	\$11.00	T0424Y	\$24.00	\$13.50
T014	\$37.00	\$ 9.90	T039	\$33.00	\$13.70	S020089	\$44.00	\$ 9.90
T017	\$49.00	\$10.80	T0321	\$52.00	\$15.10	S020093	\$33.00	\$ 5.60
T018	\$43.00	\$13.20	T0322	\$24.00	\$13.50	S020187	\$35.00	\$ 5.60
T026	\$47.00	\$11.20	T0323	\$24.00	\$13.50	S020189	\$39.00	\$ 6.50
T027	\$38.00	\$16.50	T0324	\$24.00	\$13.50	S020191	\$48.00	\$ 9.90

### Canon Ink Cartridges



Model	Genuine	Compatible	Model	Genuine	Compatible
BX-3	\$49.00	\$28.00	BCI-3eC/M/Y	\$19.00	\$6.40
BC-01	\$39.00	—	BCI-6BK	\$24.00	\$6.40
BC-02	\$39.00	\$28.00	BCI-6C/M/Y	\$24.00	\$6.40
BC-03	\$38.00	\$28.00	BCI-21BK	\$13.00	\$4.90
BC-05	\$50.00	—	BCI-21C	\$28.00	\$6.40
BC-20	\$49.00	\$28.00	BCI-24BK	\$14.00	\$5.60
BCI-3eBK	\$25.00	\$ 8.80	BCI-24C	\$33.00	\$7.20



### HP Ink Cartridges

Model	Genuine	Compatible
51625A (#25)	\$59.00	\$31.30
51626A (#26)	\$56.00	\$30.50
51629A (#29)	\$56.00	\$30.50
51645A (#45)	\$56.00	\$28.70
51649A (#49)	\$56.00	\$37.70
C1816A (#16)	\$63.00	—
C1823D (#23)	\$60.00	\$40.50
C6578D (#78)	\$60.00	\$40.50
C6614A (#120)	\$51.00	\$30.50
C6615DA (#15)	\$51.00	\$32.30
C6625A (#17)	\$65.00	\$37.70

Model	Genuine	Compatible
C6656AA (#56)	\$37.00	\$24.00
C6657AA (#57)	\$62.00	\$40.50
C6658AA (#58)	\$52.00	—
C8727A (#27)	\$34.00	—
C8728AA (#28)	\$40.00	—



### Lexmark Ink Cartridges

Model	Genuine	Model	Genuine
12A1970	\$59.00	18L0032 (#82)	\$52.00
12A1980	\$75.00	18L0042 (#83)	\$59.00
13400HC	\$65.00		
13619HC	\$71.00		
17G0050	\$53.00		
17G0060	\$59.00		
10N0217	\$39.00		
10N0227	\$43.00		
10N0016	\$59.00		
10N0026	\$65.00		



### Toner Cartridges

Model	Genuine	Compatible
HP 92274A	\$145.00	\$59.00
HP 92298A	\$149.00	\$95.00
HP C3906A	\$105.00	\$59.00
HP C3903A	\$130.00	\$75.00
HP C3909A	\$249.00	\$115.00
HP C4092A	\$99.00	\$59.00
HP C4096A	\$155.00	\$95.00
HP C4127A	\$155.00	\$75.00

Model	Genuine	Compatible
HP C4127X	\$195.00	\$95.00
HP C4129X	\$249.00	\$115.00
HP C4182X	\$285.00	\$165.00
HP C7115A	\$99.00	\$65.00
HP C7115X	\$125.00	\$85.00
HP C8061X	\$195.00	\$95.00
HP Q1338A	\$219.00	\$95.00

Model	Genuine
Samsung ML-1210D3	\$109.00
Samsung ML-1710DS	\$109.00
Samsung ML-4500D3	\$109.00
Samsung ML-5200D6	\$175.00
Samsung ML-6060D6	\$175.00
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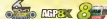
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- Socket 478, 800 MHz
- 4 DIMMs, 4GB, Dual DDR400
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- AC97 6 channel Audio
- 8 USB 2.0 ports
- 10/100 LAN



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- USB 2.0, 10/100 LAN



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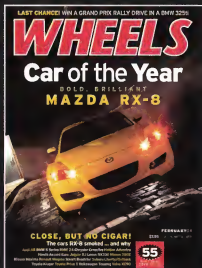
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